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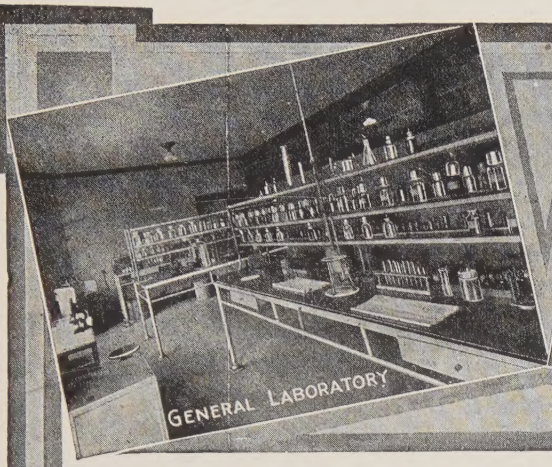

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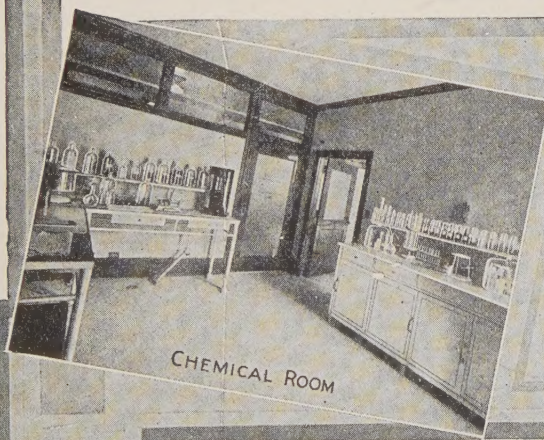

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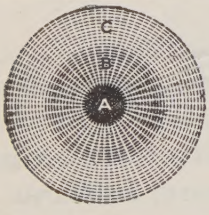
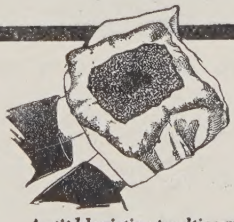


Diagram represents inflamed area. In zone "C" blood is flowing freely through underlying vessels. This forms a current away from the Antiphlogistine, whose liquid contents, therefore, follow the line of least resistance and enter the circulation through the physical process of endosmosis. In zone "A" there is stasis, no current tending to overcome Antiphlogistine's hygroscopic property. The line of least resistance for the liquid exudate is therefore, in the direction of the Antiphlogistine. In obedience to the same law exosmosis is going on in this zone, and the excess of moisture is thus accounted for.



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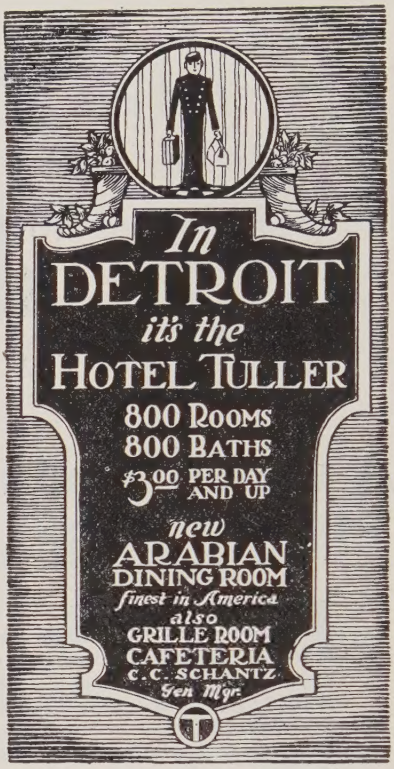

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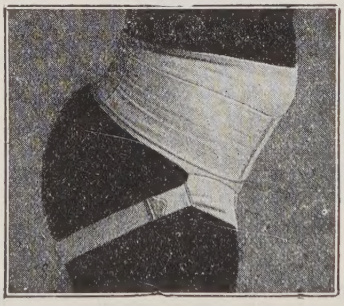

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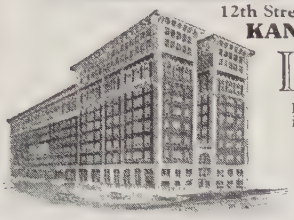

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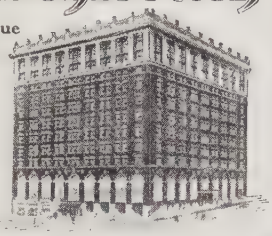

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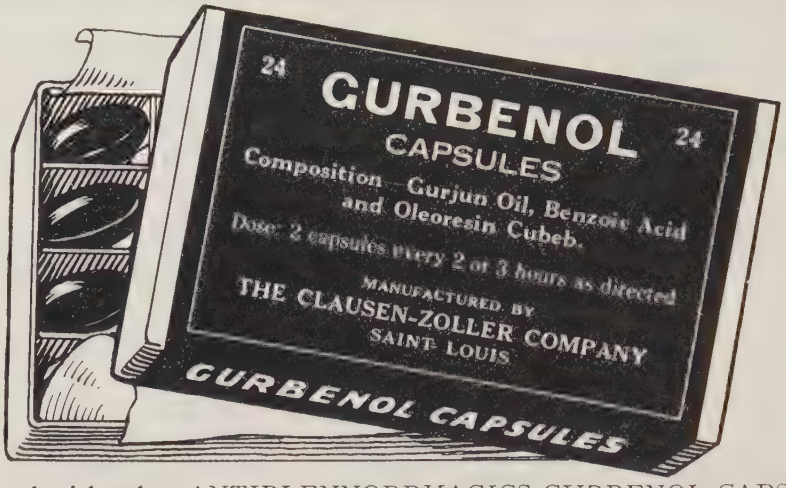

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Original Articles

THE USE OF VACCINES IN UROLOGY*

By Charles E. Barnett, M.D., Fort Wayne, Ind.

In the presentation of papers just now the major subjects are being worked into so many directions that sometimes one does not know "whether he's goin' south or comin' back." My subject selected is more humble in its greatness.

In looking backward toward the beginning of Bacterines or Vaccines, as they are more popularly and less scientifically called now, I had the privilege in 1907[1] to suggest the growing of the Neisser coccus for use as a bacterine, and in 1910,[2] while we were still groping in the dark for a culture media for the gonococcus, reported a gonococcic bacterine made from pus massaged from the seminal vesicles and prostate, in its entirety spread upon blood serum and incubated. This was reported before a joint meeting of the North Central Section of the American Urological Association and Chicago Urological Society.

I was an advocate for the use of vaccines then, to help overcome infections, and have never faltered in my belief of their usefulness all these years in spite of the fact that "fickle fashion" would sometimes say "no." There is no doubt, in my opinion, of their efficiency when a proper understanding in their administration is used.

In the different proofs of the benefit derived from bacterine introduction into the body there are two that appeal to me the most convincing: first, the similia similibus curanter in the dog licking his own wound for the cure, and second, the opsonic index of immunization.

In the reaction or shock that stimulates antibody production I consider the protein content a negligible factor in spite of the fact that foreign

(2) "Possibly a Way for the Cure of Seminal Vesicle Infection with Case Reports."—New York Medical Journal, May 21, 1910.
(1) "Perineal Section for Obstruction of Prostatic Urethra."—American Journal of Dermatology and Genitourinary Diseases, November, 1907, Vol. XI, pp. 485-493.
*Read before the Mississippi Valley Medical Association at Hot Springs, Ark., Oct. 9, 1923.

protein seems to cause the reaction or shock of hay fever, poison ivy, etc. Protein shock is due to foreign protein introduced into the circulation with no chance to metabolize. Reactions from vaccines are due to toxines in or excreted from the bacterial bodies, selective for its kind in the economy, without regard to the protein content. Illustration: 80 mg. of (one c.c.) No. 6 "B. E." Tuberculin, in a tubercular free patient, will not react.

It is likely that the reaction from typhoid, peri-typhoid and the colon bacillus vaccines are from toxines which intermingle with the colon group. Anaphylaxis which seems to be a protein poisoning is rather vague in its understanding. If protein were the cause for the reactions there would be no need for vaccines, a milk or stock protein solution could be used; however, *I do know* that when the patient is free from infection 4000 M. Neisser coccus, or 4000 M. pneumococcus, or 6000 M. meningococcus or 3000 M. streptococcus hemolyticus vaccine injected subcutaneously into the patient will give no more reaction than had distilled water been used, on the other hand, if infection is present a reaction does occur and in that way a differential diagnosis can be made.

Why the Moro and Von Pirquet tuberculin tests are made cutaneous is beyond my understanding because a subcutaneous vaccine when reacting will give a cutaneous, subcutaneous, systemic and frequently focal, thus not only giving the reaction, but sometimes showing the region that is infected.

I am still depending upon vaccine reaction as a differential diagnostic means and practically always inject subcutaneously a No. 6 "B. E." Tuberculin in order to exclude tuberculosis from the diagnosis of other infections.

Autogenous vaccines are the ones of choice because their own degree of virulency is the more likely to have the immunizing power. I like the "zoning" idea of Rosenow and think that a streptococcus from a seminal vesicle would be more likely to aid the vesiculitis than a streptococcus from furunculosis, abscessed tooth or tonsilitis, yet, in all urogenital infections where other focii of infection are present, cultures should be taken from all and their growth included in the vaccine with the addition of a polyvalient stock vaccine, milder in concentration, grown from the genitourinary tract. This polyvalient addition may cover a field that did not appear in the culture. No harm can come should its sort of infection be not present.

In 1914 I spoke of the simplicity of making unknown vaccines, as follows:[3]

"Autogenous vaccines are so easily made for the treatment of the case that I see no reason for their lack of use, even when a pathologist is not at hand, or the subject is too poor to afford vaccines.

The following is a simple way for the preparation of an unknown

(3) "The Question of Vaccines in Urogenital Infection."—The Urologic and Cutaneous Review, Vol. XVIII, No. 7, 1914.

autogenous vaccine. A portion of pus or infected secretion, such as urine or milkings from the prostate or seminal vesicles is added to say 10 c.c. of normal salt solution; to this add one drop of lysol; filter through absorbent cotton and sterilize at 60° C. (140° F.) for one hour. Inject one-fifth c.c. increasing one-fifth each succeeding dose each day until a skin reaction occurs. A slightly smaller quantity than that required to produce the skin reaction will be the weekly dose for future treatment. In this vaccine you, of course, do not know the germ organisms contained in the vaccine, but the body responds in making antibodies the same as if they were known."

Where a biological laboratory is not accessible for the making of autogenous vaccines, the stock bacterines, especially the polyvalient groupings, would be of benefit were it not for the fact that practically all their literature advocate such imperatively large doses that they become destructive rather than constructive.

In the giving of vaccines each man has a toxine dose "all his own." The syringe must not be thicker than a lead pencil and almost as long. Any man with a syringe that will not accurately measure one one-hundredth of a cubic centimeter will be a complete failure in vaccine medication. The time should be every seven days because that makes a regularity of one day each week. Always aim to give less than a reactive dose, yet advancing, always near, sometimes in, but never above a reaction because repeated reactions produce a negative phase in the index for opsonins thus aborting the result that the vaccine is given to produce.

The vaccine game is a poor one if not played well. I know of no way for unloosening a clientele better than continuing to give reactive doses of vaccine.

Tuberculin, which, as you know, is tubercule bacillus vaccine, weighed rather than counted, gives us the best illustration in dosage. Twelve and one-half one-hundredths c.c. of No. 1 equals one ten-thousandth of a mg., while the same amount twelve and one-half one-hundredths c.c. of No. 6 equals ten mg., an enormous difference which is magnified, when the initial dose, which should be one one-hundredths c.c. of No. 1, is started. Sometimes even No. 1 has to be diluted in order to accommodate a patient who is especially sensitive to its toxine. The small dose of No. 1 is working just as effectively in antibody production as the large dose of No. 6 will do after many, many doses have built up a toxic tolerance.

After all, vaccines play but a minor role in infections. Drainage is the star. So, when there is infection the first thought should be drainage with the understanding that vaccines will help with the final resolution. Nine-tenths of disease, directly or indirectly, is caused from faulty drainage.

Take the urogenital tracts drainage possibilities during infection.

The epididymis, a tortuous sac, turned upon itself at one end draining up hill through the narrowed tube until the vas reaches the summit of the hill at the internal ring.

The kidneys, which were made for four legged animals, are badly drained in their lower poles in the erect posture, the renal tubulii here would be benefited with valves like veins have, in order to relieve the hydrostatic pressure.

The ureter requires peristaltic (muscular) action to force the urine through the valve (bladder muscle) into the bladder besides passing at least three stricture regions on the way down.

The vas ampullae and seminal vesicles are mere muscular bags with a drainage canal the size of a pin.

Pus in the cup shaped utriculus masculinus bathing the fifty odd ducts leading to the prostatic acinii would drain downward were we not up on our "hind legs."

Cowper gland ducts in inflammation must pass through the hazard of the rigid triangular ligament in order to empty into the urethra.

In civilization there is a tendency to a stenosed meatus urinaris externus.

Inflammatory action from infection anywhere in the body tends to immobilize the part and hinder drainage.

Proper vaccine, knowingly administered, is a most potent stimulus to the infected focus toward resolution. Drainage *with* vaccines is the desideratum.

DISCUSSION

DR. WILLIAM T. COUGHLIN, St. Louis, Missouri: I think the essayist is quite right in saying that vaccines have a place in surgery, but I would like to say that we can not obtain good results with small doses. I did some of this work with Wright in 1907 and 1908, and he impressed upon us the fact that we should give a dose sufficient to produce a reaction because, he said, unless a reaction was produced the body did not generate antibodies. If a poison is given insidiously into the body the antibodies are not so likely to be produced as when a good dose of the poison is introduced.

I am not much concerned with gonorrhea except sometimes I take care of gonorrheal joints. If I have to do that I use vaccine together with the baking and passive and active motion and massage, and I have yet to see a joint so treated that did not yield perfect results. Furthermore, I have aspirated the joint contents and reinjected the fluid subcutaneously not only for gonorrheal effusion, but also for effusions that occur in the course of polyarthritis that sometimes occur with wounds about the mouth. I have had three or four cases with wounds about the mouth where a streptococcus infection of the joints was present. In those cases in which I have used reinjection of the fluid I have not been able to cultivate any of the organisms, but, notwithstanding this after reinjection of the fluid for this presumable streptococcic infection and gonococcic infection, we have had quite evident reactions, and we believe the injections did some good.

The milk injections without any bacterins present I have also had experi-

ence with, and I must say that they also seem to do a great deal of good. I have used those in patients who refused operation for large masses or infections in the pelvis, and with long time rest and baking these cases have terminated in cures.

I want to say about the use of vaccines in cases of furunculosis, that I have had some experience with the autogenous vaccine and with the stock vaccine, and provided I used enough of either one to produce a reaction, it seems to me the results were beneficial. Now, we never give a second injection until the reaction from the first injection has disappeared, which consists of redness of the skin at the site of the previous injection, then is the favorable time for the next injection, and that next injection has been sometimes twice as large as the first, going on until we use enormous doses.

DR. WALTER F. MARTIN, Battle Creek, Michigan: I use vaccines a great deal in my work as a urologist, in many cases with apparently good results while in others we find no specific evidence of their value. Vaccines should be looked upon as only one of our therapeutic measures to be used in cases of infection. It is foolish to look upon vaccine as a specific. Thorough drainage is essential in every case of infection, but in our work there are many instances where this cannot be established. Thus the necessity for using every therapeutic measure which will raise the patient's resistance. I get the best results when there is a reaction following the injection, and aim to give a sufficient amount to produce a mild reaction, accompanied by fever. Injections are usually repeated every fourth or fifth day. Mixed stock vaccines have been quite as effective as autogenous vaccines.

DR. BARNETT (Closing): In answer to the gonorrheal arthritis question the gonococcus is not there any more. It is practically always a mixed infection and frequently not even the remnants of the gonococci are found, so that milk protein or any reaction for hyperemia will do. Should the case be an acute gonococci arthritis, the gonorrheal vaccine will not react. We do not know why and neither does Wright; however, there is one thing I do know and that is an infected focus that is insufficiently drainable is benefited, for its exclusion, by giving very small doses of vaccine, of its infection, gradually increased week by week.

Wright is not exactly satisfied with himself at the present time in regard to the positive and negative phase of the opsonic index, which was such an important factor years ago, and Wright also is not, just now, dead sure about the difference between the protein reaction and the toxin reaction. The toxin, which comes from the excretion of the bacterial bodies in the culture media produces a reaction separate from the protein proper of their bodies; for that reason we are not now able to follow Wright. Our understanding of the protein and toxine reaction has another up-set in the new treatment for furunculosis. The injection of autogenous blood into the boil cures it; that would mean the toxin side if it were not a fact that it was found that the injection of horse serum did the same thing.

With vaccines in small doses I have proven to my own satisfaction that the toxin portion of the vaccine is the reactive principle there. Where you have an infection that needs to be cleaned out, like infection of the seminal vesicles, or epididymis, or small tubercular fosii elsewhere in the body, establish the most thorough drainage possible in these chronic cases and then stimulate the focal infections with small doses of vaccine towards resolution. If reactive doses are given they will undo all the good that was coming from the stimulating doses, non-reactive in character, thus inhibiting anti-body production. Take tuberculosis as an illustration—we have all had tuberculosis at one time

or another—should you have a focus of infection in the lymphatics of the lung that is feeding out the tubercular toxin in the patient constantly, in order to overcome that complication in the case, small doses of tuberculin should be given along with the autogenous vaccine and the advancement of the dosage each seven days should never be more than one one-hundredth of a cubic centimeter. Should an ordinary 2 c.c syringe be used failure will be the outcome, for it is impossible to measure one one-hundredth of a c.c. with that kind of syringe.

In spite of all objections to the contrary, as a help to overcome infection, thorough drainage, along with vaccine of that infection, is the best treatment, and in my opinion drainage without vaccine is less efficacious.

WHY SOME PROSTATECTOMIES FAIL WITH A DISCUSSION OF METHODS OF PREVENTING FAILURE

W. F. Martin, M.D., Battle Creek, Michigan

A malady which so seriously cripples so large a number of mature and otherwise able-bodied men and prevents them from enjoying the fruits of their life-long labors, as does disease of the prostate, is certainly worthy of the earnest attention of every medical man.

The great advance in the last decade in dealing with this class of disorders is one of the triumphs of modern surgery. Not only has the mortality rate of the operation been reduced about 15%, but the end results to the patient, assuring him of the natural functioning of the genito-urinary organs without annoying symptoms, have been made more certain.

A successful prostatectomy is one which not only saves the patient's life but affords complete relief from all urinary discomforts. Failure may be either "total" or "partial."

Causes for Total Failure

The most common causes for total failure, or immediate mortality, stated in the order of their frequency, are, uremia, hemorrhage, cardiac failure, pneumonia, sepsis, shock, cancer,

1. Uremia

The mortality from uremia, which has heretofore been the biggest factor in total failure, may be almost wholly eliminated by operating early,—that is, before the mechanical obstruction has developed sufficiently to produce the back pressure which so seriously injures the kidneys; and by gradual decompression methods with sufficient preliminary treatment before enucleation is performed, in the advanced cases.

The wisdom of removing a prostate which is causing definite obstruction, before serious and permanent changes have been produced in the bladder, kidneys, and other vital organs, is evident. As we have learned that it is better to repair the roof before the storm breaks, so we are

*Read before the Mississippi Valley Medical Association at Hot Springs, Ark., Oct. 9, 1923.

learning that it is better to remove the prostate before the emergency develops.

The technique of the urologist, in handling advanced cases of obstruction, is now quite uniform. It consists of gradual decompression, as described by Von Zwalenburg, with preliminary supra-pubic drainage in all infected cases and appropriate treatment until the blood chemistry and the general physical condition of the patient indicate his ability to stand enucleation. No time schedule should be established for this preliminary drainage and treatment; it should be continued until the patient's condidition is right, even if it be six months or a year.

One thing I have found of paramount value in assisting the kidneys to recover their function—the reduction of intestinal toxaemia, which always coexists in these cases, by the methods suggested by Tissier, Torrey, Rettger and others, long and extensively used at the Battle Creek Sanitarium.

The advantage of reducing the toxins which are absorbed from the intestines into the blood, to be eliminated by the kidneys, needs no argument. These intestinal toxins are produced by the decomposition of the food residues. They are the result of a putrefactive flora and are favored by stasis. The flora can be speedily changed from the putrefactive to the fermentative type by a low protein diet, plus the administration of 1/3 of a glass of Lactose three times a day. The milk sugar is slowly absorbed, and when taken in this quantity a sufficient amount is carried into the colon to furnish a suitable nutriment medium to promote the growth of the aciduric organisms. Their development produces an acid reaction in the colon, which inhibits the growth of the proteolytic bacteria such as B. Welchii and B. putrificus, B. proteus, etc. This simple fermentative process produces only harmless by-products. The acid reaction in the colon also stimulates peristalsis and thus overcomes intestinal stasis without the use of irritating cathartics. When stasis persists, a thorough colonic lavage, followed by injections of 6 oz. of B. acidophilus culture daily hastens the elimination of the Proteolytic Flora. Usually about ten days' treatment by this method is required to change the intestinal flora. This procedure is a valuable means of preparing any surgical case for operation, but possesses especial merit in cases in which uremia is a menace.

2. Hemorrhage

Failure from hemorrhage has been greatly reduced by improved surgical technique, consisting of more careful enucleation of the gland, the use of ligatures on spurting vessels, the more careful packing of the wound cavity, or the use of a Hagner or Pilcher bag. The routine, preliminary use of the blood coagulation test enables the detection of cases of hemophilia and delayed clotting. In such cases operation should be postponed until the coagulation time has been reduced to normal by the

administration of calcium lactate, coagulose, or, best of all, by blood transfusion. Attention given to these details shortens the time of convalescence, and often saves distressing and disastrous post operative experiences.

3. Pneumonia

Pneumonia, which is the bane of every surgeon's experience, and frequently defeats an otherwise successful effort, can be guarded against by putting patients in the Trendetenburg's position soon after operation, by getting them out in wheelchairs early, by frequent change of position, with deep breathing exercises directed by the nurse twice daily, and by hot and cold applications to the spine with cold mitten rubs to the extremities to stimulate peripheral circulation. It is essential to avoid exposures, by keeping these patients dry. We have found it possible to avoid leakage from the drainage by the use of the Hamilton-Irving Suprapubic Box. We have used this apparatus for the past ten years, and it has proven successful in keeping both the patient and his bed dry, adding greatly to his comfort and thus minimizing exposure to danger from chilling.

Perhaps the most important of all means of preventing pneumonia is the use of spinal or nitrous-oxide gas anesthesia, with care to avoid permitting the patient to become cyanotic even for a moment. Rubbing the chest with ice or the application to the chest of cold compresses at frequent intervals during the operation, keeps the patient breathing deeply and thus obviates the necessity for reducing the proportion of oxygen so low as to cause cyanosis.

The chest compress worn for some days after the operation is also useful, as is likewise the saturation of the body with carbohydrates before the operation.

4. Cardiac Failure

Many old men have myocardial troubles. This is particularly true of prostatics. Such cases may be fortified and prepared for operation by preliminary treatment consisting of rest in bed with intermittent use of icebags over the precordium, and the administration of 15-20 gtts. of digitalis t. i. d. until the pulse becomes regular and the heart tones distinct. The frequent observation of pulse and blood pressure during and after operation permits the early institution of measures of relief while they may still be effective.

5. Shock

The number of failures from shock has been greatly reduced by improvements in technique which eliminate the unnecessary loss of blood, and by a better appreciation of the role played by pain, with more attention given to its relief.

Shock may be often successfully combated by the intravenous injection of glucose in Ringer's solution, by caffein and adrenalin given hypodermatically, or, if necessary, by blood transfusion.

6. Sepsis

Poor drainage is apt to result in active infection. Blood clots or pieces of detached tissue left in the wound cavity or in the bladder are likely to lead to infection. Inlaying catheters predispose to epididymitis. Early closing of the bladder opening before existing infection is eradicated is frequently accompanied by a pyelitis of grave character. These undesirable complications may be avoided by proper drainage, careful irrigations, and the administration of urinary antiseptics until the urine becomes clear. I believe that vasectomy, as practiced by Marion for the past ten years, is a valuable preliminary measure in all cases where it is necessary or advisable to use an inlaying catheter. This will prevent the epididymitis which otherwise happens all too often.

7. Cancer

Studies by Young, Munson, the Mayos and others have shown that from 15% to 25% of prostates removed show microscopic evidences of cancer. Total failures, or immediate deaths, are much more frequent in malignant cases. Statistics indicate that one patient out of every five presented for treatment of prostatism is, or will be, a cancer case. It is our duty, then, to suspect every man to be that fifth man, and to search carefully for the signs and symptoms of early malignancy.

Symptoms of pain in the perineum, glans penis, bladder, or sacral region, referred down the hips, with frequency out of all proportion to the amount of retention and without any urinary changes, together with a hard, small, irregular or flat-shaped gland which is held rigid, and has not a definite border outline, with localized areas of induration, should lead us to consider the possibility of malignancy.

It is evident that the only way in which we can avoid failure from this cause is early recognition, radical removal, followed by thorough deep radiation. It is distressing to note how many of these cases are roughly treated with instruments and traumatized by massage, thus fostering the development of metastases, until conditions develop making radical treatment impossible. Success in combating prostatic cancer can only be accomplished by educating ourselves to avoid manipulation of suspicious cases and to insist on early radical treatment.

Causes for Partial Failure Are:

Infection. Stricture of urethra or sphincter neck. Incomplete removal. Partially detached shreds overhanging fold at posterior lip. Diverticuli. Incompetent Uretero-vesical orfice. Calculi and incontinence.

A prostatectomy should not be considered a complete success unless

the patient is made free from bladder symptoms. It should be the aim of every surgeon to obtain for his patient perfect results, for it is very disappointing to the patient and embarrassing experience to the surgeon when frequent urination, nocturia, pain, etc., continue after the operation.

The chief active cause for persistence of symptoms is infection. A normal bladder without obstruction should speedily recover from an infection. A bladder which cannot completely empty itself, which contains a foreign body, or which receives infection from above, does not recover.

Urethral strictures can be avoided by the passage of suitable dilators during convalescence. The overhanging fold at the posterior lip of the bladder neck may be avoided by an inspection after the enucleation, and, if found to exist, may be removed by the excision of a wedge-shaped piece. If its existence is discovered later, it may be relieved by fulguration.

Incomplete removal is a frequent cause of failure. This, also, may be frequently obviated by careful inspection following the enucleation.

In all cases of persisting infection, the seminal vesicles must not be overlooked as a possible seat of trouble.

Bladder diverticula can, and should be, discovered previous to operation by careful cystoscopic methods, and, when discovered, should receive appropriate surgical treatment prior to the enucleation.

Incomplete uretero-vesicular orifices may be and should be discovered prior to operation. This abnormality can not always be successfully removed and may remain a cause of continued disturbance. If unilateral, and if the kidney on that side is badly injured, it should be removed. If, however, the function is good, the infection may be greatly relieved by prolonged drainage, and later controlled by relieving the back-pressure by means of an inlaying catheter.

There are two distinct advantages in the discovery of a bladder diverticulum or of incompetent uretero-vesical orifices prior to operation: First, this enables the surgeon to deal more specifically with the situation; and, second, this offers the patient a definite and clear-cut reason for imperfect results should such occur, to the end and that he may become a missionary in advising other prostatic sufferers to receive radical treatment before such complications develop as will make perfect results from operation impossible.

Calculus

As a cause for partial failure in prostatectomy, calculi must be considered. Caraven and Lourdell recently reported three cases in which calculi formed in the bladder a few months after operation, and collected from records sixty-eight cases. We have had five such cases where calculi have formed—four discovered within the first year, and one in the second year. The history in all five cases indicated the beginning of the calculus

soon after the operation. In two of these cases the calculus was in the prostatic cavity.

The work at Mayo's has demonstrated the role of infection in the formation of urinary calculi. This must always be looked for and properly dealt with. As a precipitating factor we believe that foreign bodies, blood clots, pieces of tissues, shreds of gauze, or small pieces of pre-existing calculus favor the early development of calculi, by furnishing a nucleus upon which the salts are deposited. A little extra pains taken at the time of the operation to make sure that no cause for obstruction persists at the bladder neck, that no foreign elements are left behind, and that especial attention is given to the removal of infection by irrigations, etc., before the patient is discharged, will prevent this disappointing complication.

I wish especially to emphasize the value of careful cystoscopic examination of the bladder before the patient is discharged after operation. If any of the above mentioned conditions exist, it is better that the operative surgeon find them, and adequately deal with them, than for them to be discovered by someone else.

In reconsidering the causes for failure in prostatic cases the outstanding one is—*DELAYED ACTION*. Almost all complications may be avoided by early radical removal of obstructing prostatic tumors. Not only would complete failures, or deaths, from the operation be materially reduced, but many of the partial failures resulting from secondary infections, malignant degeneration, and chronic toxaemia due to impaired kidney function would be aborted.

It is plainly our duty to advise action before it is too late. We should educate both ourselves and the public to understand that frequency and nocturia are not necessarily complements of old age, nor a normal physiological condition which the man of advancing years must accept as Fate.

Men should be taught to recognize the value of dealing with prostatic tumors in the same manner as women have been taught, and now quite generally recognize, the early treatment of breast tumors.

Many men hesitate to submit to operation because of the popular belief that prostatectomy is followed by impotence—this is another fallacy we need to correct.

The goal of perfection in the prostatic problem will be sooner reached if we teach to every man past fifty the value of a complete physical examination annually, including a careful urological examination by a competent urologist. By so doing prostatic surgery can be elevated from an emergency procedure to one of Preventive Surgery.

DISCUSSION

DR. LAUGHLIN O. MALSBURY, Chicago: The essayist spoke of the importance of preliminary preparation of these cases for prostatectomy, which is very satisfactory, but he did not describe how we must proceed. I under-

stand that each case is a law unto itself, but we should have some general method of procedure. For instance, let us take dribbling as a complication. The patient who has dribbling has had back pressure, and how are you going to relieve that patient and prepare him for operation.

Another point is retention of urine in cases of enlarged prostate. Why is this back pressure so damaging if removed immediately? It only comes on gradually, and suggests that it should be relieved gradually, but it occurs when the system is saturated with uremia, and the quicker it is relieved of the poisonous substances the better for it. If any patient is operated on in this condition the result is almost sure to prove fatal, and so it is very essential to have these patients properly prepared. In my experience they are difficult to prepare, and I think I have found a method that applies pretty well to a certain class of cases, and it is disappointing not to find some method to apply even to the individual case. The author of the paper might help us out in such cases.

DR. WILLIAM V. LAWS, Hot Springs National Park, Arkansas: I wish to express my appreciation of this excellent paper; it is one of the best I have ever heard on the subject. The proper procedure in the preparation of the patient and handling of complications as they arise has been thoroughly outlined by the essayist.

The point of early operation before complications set in, especially the involvement of the kidneys by back pressure, is one that I think should be particularly emphasized, as it will greatly enhance the chances of success following Prostatectomy.

DR. MARTIN (closing): "In answer to the first question, 'Why is it dangerous for a man to have a large quantity of residual urine drawn off at once?" I would say that when the bladder is greatly distended there is a back pressure, which requires extra effort upon the part of the kidneys. When the bladder is suddenly emptied, there is a reflex congestion of the kidney with swelling, which is frequently accompanied by anuria. To relieve this congestion, it is necessary gradually to empty the distended bladder. This we accomplish by an inlaying catheter with gradual decompression methods, as suggested by Van Zwalenburg. If the catheter cannot be passed, a supra-public drainage can be established with local anaesthesia and the bladder gradually decompressed by the same method as with the inlaying catheter.

"It is the main mission of my paper to emphasize the necessity of recognizing those conditions which interfere with the successful results of prostatectomy, the chief of which is cancer. We can only hope to conquer cancer of the prostate by detecting it early. There is an average of 20% of all prostatics developing cancer, and this unfortunate toll of human life with great suffering can only be aborted by early recognition and radical removal. Every man with symptoms of obstruction at the bladder neck with residual urine should have careful examination and appropriate treatment.

VENTRAL HERNIA FOLLOWING APPENDECTOMY

By Leigh F. Watson, M. D., Chicago, Illinois

The usual causes of ventral hernia are postoperative suppuration in the abdominal wall; the use of drains that are larger than necessary; a faulty closure of the muscle and fascia layers; the division of nerves supplying muscles; and the use of the wrong incision. The McBurney incision gives the lowest percentage of postoperative hernias.

The operation is indicated in all cases of ventral hernia, except in those patients whose general condition does not warrant the undertaking of any operative procedure, or when there is no prospect of reducing the hernia and closing the opening.

In hernia following appendectomy, an elliptical incision should be used if the sac is thin and adherent to the skin; if the sac is not adherent, a vertical incision saves time. The skin incision can be made through the old scar or directly over the hernia, and extended down through the fat to the neck of the sac. Nothing is gained by opening the fundus, the adhesions here often make it difficult or impossible to reach the neck of the sac and time is saved by beginning the dissection at the neck and working inward. When there are no symptoms of obstruction, it is usually advisable to leave the sac; it is tedious to remove it, and new adhesions are liable to form, causing more trouble than the old ones. Besides, the sac can be inverted or folded on itself and used to reenforce the closure of the opening. If the sac is not removed, it is important to sew up any holes in it to avoid the chance of strangulation through one of them.

I have found that the simplest method of exposing the hernial opening is to invert the sac on one or two fingers, and feel the sharp fascial edge which is usually most distinct on the outer side of the hernia near Poupart's ligament. With the finger as a guide, the incision is made directly down to the fascia. Once the aponeurosis is located, it is easy to continue the incision and expose the fascia entirely around the neck of the sac. It is important to extend the dissection for some distance from the hernial opening in order to recognize the muscle and fascia layers and to secure flaps that can be united without undue tension. The abdominal wall should be reconstructed as well as possible; the transversalis and internal oblique muscles and fascia have become so thin that they cannot be separated, and they should be used as a single flap, which is drawn down and sutured beneath the outer fascial edge of the wound, this edge being the external oblique aponeurosis or Poupart's ligament.

The second flap, which is secured from the aponeurosis of the external oblique is drawn down and lapped under Poupart's ligament and over the first flap. Sometimes the musculature and fascia are so thin that only one flap can be obtained. A simple approximation of the edges of the

fascia is not sufficient; they must be overlapped for a distance of one or two inches to give the maximum of strength to the abdominal wall.

Finally, tension sutures must be inserted to take the strain off of the fascial stitches. When recurrence takes place, the hernia first appears at a point where the fascial closure is defective. This weak spot may be due to insufficient lapping of the fascial edges, to closure under too much tension, or to infection.

Lipectomy should be combined with the operation for ventral hernia in obese subjects with pendulous abdomens.

Spontaneous hernias in the linea semilunaris are almost always small and of the interstitial type. They are rare, but the percentage of strangulation is high. Abdominal rigidity, with a localized point of tenderness in the region of the fold of Douglas, if associated with the symptoms of intestinal obstruction, calls for immediate operation. The incision should be made directly over the point of tenderness. When diagnosis is impossible and there is no painful point, a median incision should be made and all the possible sites of hernial strangulation examined.

Strangulation of traumatic or postoperative ventral hernia is not common. When it occurs it is usually intrasaccular. An irreducible ventral hernia with symptoms of obstruction requires immediate operation.

The preoperative treatment of the massive irreducible ventral hernia is very important, to minimize the danger of pulmonary edema, pneumonia, disturbances in the cardiovascular system, and acute dilatation of the stomach.

INTRAVENOUS SOLUTIONS NEED NOT BE ISOTONIC

The Influence of Concentration and Osmotic Pressure.

David Loeser, New York

To all medical men the ultimate aim of science, whether physical, chemical or biological, should be an explanation of life processes, each science cooperating with the other to supply the missing link. One by one relationships are established and added to our store of orderly, demonstrable scientific facts. Though recently developed, the theory and science of solutions has increased our knowledge of vial phenomena to a remarkable degree.

The law of osmotic pressure was said by Arrhenius to be one of the most general laws of matter that we know. We may add that the comparatively rapid increase in scientific knowledge in the last century is due to the recognition of the fact that the same general fundamental laws underlie all phenomena.

This is well illustrated by the development of the theory of solutions, as stated by Van't Hoff, who explained osmotic pressure, by Arrhenius,

who enunciated the dissociation theory, and by Ostwald, the great organizer and disseminator of new ideas. We cannot enter here into a further description of the widespread influence which the work of these men exerted upon scientific progress other than to state that it laid the foundation of modern physical chemistry. Nor is it merely a coincident that the practical use of intravenous solutions began in the same period.

Osmotic Pressure

"What is osmotic pressure?" Van't Hoff, in his address on the occasion of his receiving the Nobel Prize, asked this question and answered it as follows: If a solution, for example, of sugar and water, is separated from a pure solvent (in this case water) by a membrane which allows the water but not the sugar to pass through, then the water will be as if it were sucked through the membrane into the solution. This results because there is greater pressure on the side of the membrane to which the water goes, that is, on the side of the solution. This is osmotic pressure. This passage of water through cell membranes had previously been observed by students of plant and animal biology.

Cytolysis and Plasmolysis

When a cell is immersed in water it swells, and the water passes through the cell membrane until finally the pressure within bursts the membrane and cytolysis occurs. When a cell is immersed in a strong solution of salt, water passes from the cell through the membrane, causing the contents of the cell to shrink and separate from the membrane. This is called plasmolysis.

In 1883 de Vries, of the University of Amsterdam, published a paper entitled "A Method for Analysing the Amount of Turgor." He demonstrated plasmolysis and cytolysis in detail, employing various vegetable cells and salts in solution. When a solution causes neither plasmolysis or cytolysis, i. e., when the osmotic pressures on both sides of the membrane are in equilibrium, he called the solution isotonic. In other words, *two solutions of equal osmotic pressure are isotonic with one another.*

He found also that the equivalent* amounts of various salts, dissolved in the same volume of water, gave isotonic solutions. They possessed equal osmotic pressure, or, as he expressed it, "The isotonic coefficients for various salts of the same chemical groups were identical." De Vries defined an isotonic coefficient as that quantity expressing the amount of the attraction of a gram molecular weight of the substance for water in a dilute aqueous solution.

He also drew attention to the definite relationship between osmotic pressure and both the lowering of the freezing point and the vapor pressure of solutions. De Vries was unable to explain these facts on any theoretical basis. He appealed therefore to his colleague, Van't Hoff, professor

of chemistry at the same University. Van't Hoff inquired whether any quantitative work had been done on osmotic pressure. De Vries referred him to the work of Pfeffer, which had been published in 1877. (Osmotische Untersuchungen).

Pfeffer had been working with sugar solutions of various concentrations, measuring their osmotic pressure in specially constructed cells. These cells consisted of a porous cup in which a semipermeable membrane was formed by allowing solutions of copper sulphate and potassium ferrocyanide to diffuse through from opposite sides of the cell wall. The cell was filled with the liquid under investigation, a manometer attached, and the whole immersed in pure water. Water entered the cell, causing an increase in the manometer reading. This increase was measured and recorded by Pfeffer, but he made no attempt to either calculate or interpret his results.

Van't Hoff proceeded to study Pfeffer's figures carefully. He first observed that just as Boyle's law for gases states that pressure varies with concentration, Pfeffer's results indicated that the osmotic pressure of sugar solutions varies with concentration in the same sense. This is shown by the following figures:

Concentration	Pressure	P/C
1%	535 mm	535 mm
2%	1016 "	508 "
4%	2082 "	521 "
6%	3075 "	513 "

The nearly constant value of p/c (the variations are within the limits of experimental error) indicate that a proportionality between osmotic pressure and concentration must exist.

The experiments of De Vries, mentioned above, offer further proof that osmotic pressure in solutions varies with concentration.

Van't Hoff next examined Pfeffer's results to see whether or not Gay-Lussac's law held (i. e. whether the osmotic pressure was proportional to the absolute temperature provided that the pressure remains constant). He found that the law held. Thus the osmotic pressure of a solution of cane sugar, observed at 32° C., was 544 mm. The calculated pressure at 14.15° C. is 512 mm.; that observed, 510 mm.

Just as Bolye's law, applied to solutions, receives support from the fact that isotonic solutions preserved equal osmotic pressure when their concentrations were equally varied, so the law of Gay-Lussac is supported by the result that this isotonism is likewise preserved for equal changes in temperature. This fact was established by physiological methods, this time by Donders and Hamburger. (*Onderzoekinaen gedaan in het physiologish Laboratorium der Utrechtsh Hooge school,* (3) 9:26) who, working in a manner similar to that of De Vries, but now with animal cells

*Displacing or combining with equal amount hydrogen.

(blood corpuscles), found that solutions of potassium nitrate, sodium chloride, and sugar, which are isotonic with the contents of the cells in question at 0°, and therefore with one another, show exactly the same relation at 34°. This may be seen from the following table:

	Temp. 0° C.	Temp. 34° C.
KNO_3	1.052-1.03%	1.052-1.03%
Na Cl	0.620-0.609%	0.620-0.609%
$C_{12}H_{22}O_{11}$	5.48 5.38%	5.48 -5.38%

From these facts Van't Hoff proved thermodynamically that the osmotic pressure exerted by a substance in solution possesses the same value as the gaseous pressure which the substance would exert if the same amount were present in the gaseous state at the same temperature and in the same volume.

Gas Laws

Three fundamental principles, known as the gas laws, have been involved in our discussion thus far. The first principle states that the amount of a gas expressed by its molecular weight in grams occupies 22.4 liters at standard temperature and pressure. Thus 32 grams of oxygen (the gram molecular weight) occupy 22.4 liters at 760 mm. and 0° C.

The second law states that the volume of a gas decreases inversely as the pressure increases. Doubling the pressure (2 × 760 mm.) reduces the volume to one half. 22.4 liters is thus reduced to 11.2 liters. By applying the pressure of 22.4 atmospheres (22.4 × 760 mm.), the volume is reduced to one liter.

The third law states that the gases expand 1/273 of their volume at 0° C. for every degree centrigrade that their temperature is raised.*[2]

Pfeffer's experiments demonstrated that 342 grams (molecular weight in grams) of sugar contained in one liter of aqueous solution, produced an osmotic pressure of 22.4 atmospheres (22.4 × 760 mm.). 342 grams of sugar contained in 22.4 liters of aqueous solution produced an osmotic pressure of one atmosphere or 760 mm. The temperature is assumed to be 0° C.

It should be evident therefore, that if the molecular weight of a salt is known, the osmotic pressure which it produces in aqueous solution can be calculated.

Ionization

Certain substances seemed to give a much higher osmotic pressure than the theory called for, however. These substances were salts such as sodium chloride. Raolt had noticed that these same substances gave an abnormal depression of the freezing point and de Vries had noticed that different concentrations were necessary to produce isotonic solutions, dependent upon whether the substance was monobasic, diabasic, or tribasic.

*[2]Zero C. = 273° absolute. 20° C. = 293° absolute.

Arrhenius now stepped forward to explain these seeming anomalies by means of his theory of ionization. We are all familiar with the development and reception of this theory. Arrhenius first stated that substances dissociated into two parts in his doctor's dissertation (1883). Because he realized that he would be refused his degree if his statements were too radical, he did not offer outright his complete explanation of ionization. As it was, he barely satisfied the authorities that he was competent enough to receive a doctor's degree.

Unrecognized at home, Arrhenius sent copies of his thesis to the leading chemists of other countries and found an ardent champion in Ostwald. In later years, when Arrhenius' theory had well nigh assumed the majesty of a law, Ostwald was fond of relating how he received, on the same day, the Swede's dissertation, a toothache, and a nice daughter. "That was too much for one day," was Arrhenius' comment "the worst was the dissertation, for the others developed quite normally."

Three years later, in 1886, Arrhenius worked independently in Ostwald's laboratory, cementing a rare friendship between these two great chemists. He then left for Wurzberg to study under Kohlrausch. Here he came upon Van't Hoff's memoir on osmotic pressure. It now became quite clear to Arrhenius that all electrolytes consist of the equivalent of at least two molecules and not one—that a molecule of sodium chloride, when dissolved in water, produces the effect of two molecules, due to the formation of two ions, sodium and chlorine,*[3] each of which behaves as if it were a molecule. This consideration explained the double osmotic pressure observed by Van't Hoff and led to a correspondence which culminated in another rare friendship between the two great physical chemists of the age. Arrhenius worked with Van't Hoff for a time, and finally in 1887 we find published in the first issue of the Zeitschrift für physikalische Chemie, Van't Hoff's revised paper on osmotic pressure, in which account is taken of ionization, and Arrhenius' paper, in which his theory of ionization is first declared openly and completely.

It is reported that Ostwald considered as his greatest work the wedding of Arrhenius' theory of ionization with Van't Hoff's theory of osmotic pressure. Succeeding chemists have amplified and modified both of these great generalizations.

A study of electrical conductivity in solutions followed logically from this work on ionization. Finally definite relationships between the coligative properties of solutions (osmotic pressure, conductivity, vapor pressure, boiling point, freezing point) and the number of dissolved molecules of the foreign substance present, have been established.

For calculating osmotic pressure, determinations of the lowering of

*[3] $\underset{\text{dissolved}}{NaCl} = \underset{\text{Ionized}}{Na^{+} + Cl^{-}}$

the freezing point have proven more practical than any other method. A solution freezes at a lower temperature than pure water and the depression of the freezing point is proportional to the number present of either molecules or ions or both. We now realize that although the mathematical expression of osmotic pressure, as given by Van't Hoff's analogy, is correct in form as applied to infinitely dilute solutions, his explanation is fundamentally incorrect inasmuch as it neglects the solvent entirely. It is beyond the scope of this paper to enter into a discussion of these developments other than to point out that modern thought considers the solvent and not the dissolved substances to be the controlling factor.

Osmotic pressure is the result of the forces set up when equilibrium is being obtained between solutions of different concentrations separated by a membrane permeable to the solvent but not to the dissolved substances. Van't Hoff's method of calculation holds for infinitely dilute solutions however, and since in the blood stream we are dealing with such solutions we shall follow his method.

Intravenous and Isotonic Solutions

Let us now consider the relationship between osmotic pressure and intravenous therapy. By intravenous therapy I mean the intravenous therapy as practiced in 1923 by the majority of physicians, i. e., the intravenous injection of small quantities of solution containing the therapeutic dose by the syringe method. There is no place in intravenous therapy, as rationally practiced, for the old-fashioned, cumbersome, unscientific gravity method, by which as many as seven or eight hundred cubic centimeters were frequently injected, except perhaps to replace blood lost in hemorrhage, etc. The success of the syringe method depends primarily upon the solution used. This must be accurately and scientifically prepared and biologically tested. But must it necessarily be isotonic with the blood stream? Most emphatically, "No!" That is the point which I wish to leave my readers. When a few cubic centimeters of solution only are injected into the vein, it is immaterial whether the solution is hypotonic, isotonic, or hypertonic. It is only essential that the solution be compatible with the blood stream.

This compatibility with the blood stream, however, is entirely independent of isotonicity. In support of this, consider the fact that it was not until reliable and controlled solutions of U.S.P. and standard remedies were supplied that intravenous medication became a safe and practical office procedure. Yet these solutions, in the majority of cases, are decidedly hypertonic.

The myth which demands that all solutions injected into the blood stream must be isotonic with the latter is a relic of the gravity injections with which intravenous therapy was introduced. In the nineties and early part of the present century solutions were injected intravenously as a last resort in moribund, hopeless cases, in which all else had failed. Pneumonia,

hemorrhage, collapse and other equally unrelated conditions were treated alike. All were given injections of physiological saline in huge quantities. Only slight therapeutic results were expected, for scarcely anything was known concerning the toxicity and action of drugs when introduced directly into the blood stream. Yet it was realized that certain factors not encountered when drugs are administered per os must be considered.

The first question which presented itself to these pioneers was the question of isotonicity. In order to prevent a disturbance of the normal equilibrium of the organism they argued that the solutions must be isotonic with the blood stream. When we realize that from one fourth to one third the volume of the blood stream was introduced we can well realize the anxiety of these physicians concerning the normal conditions of equilibrium in the organism. Subsequent experience proved, however, that even though the solutions used in the gravity method were isotonic with the blood stream, grave reactions resulted, so that isotonicity per se was not the all-controlling factor. Further experience proved that if the large volume, gravity method was replaced by the small volume, syringe method, these reactions disappeared. But somehow the fetish of isotonicity was carried over to the syringe method.

The isotonicity of the blood has been determined by the depression of the freezing point. This depression of the freezing point is approximately that of a 0.9% sodium cloride solution. In other words, the tissue cells and blood corpuscles are in equilibrium with any solution whose osmotic pressure is the same as that of an 0.9% NaCl solution.

What is the osmotic pressure of an 0.9% NaCl solution? Because the solution is sufficiently dilute we may apply Van't Hoff's law. In other words, one gram molecule of the substance will exert a pressure of 760 mm. when it is contained in a volume of 22.4 liters at 0° C. In our isotonic sodium chloride solution we have present 0.9 gm. per liter or 201.6 gm. in 22.4 liters. The gram molecular weight of sodium chloride is 58.5 gm. (sodium, 23 + chlorine, 35.5). Hence the osmotic pressure of an 0.9% solution of Na Cl is calculated as follows:

$$\frac{201.6}{58.5}\times 760\times\frac{293}{273}\times 2=6179.8=\text{about } 7.2 \text{ (atmospheres}$$

mm.

In other words, any solution isotonic with the blood stream must have an osmotic pressure of about 6100 mm. or 7.2 atmospheres. $\frac{201.6}{58.5}$ is the weight of salt divided by the molecular weight. 760 mm. is one atmosphere of pressure measured by mercury column. $\frac{293}{273}$ is the temperature correction, for the measurements were made at room temperature; this I have assumed to be 20° C. The result is multiplied by 2 to correct for

ionization which I have assumed to be complete for simplicity's sake. It is actually some 90 odd %.

I wish to point out in this connection the misleading statements made by some manufacturers of intravenous products, who claim that all of their solutions are isotonic with the blood. Let us take one of our standard solutions, 10% sodium iodide solution. What is the osmotic pressure of such a solution? The molecular weight in grams of NaI is 150 gm. If this is contained in 1000cc., it will give an osmotic pressure of 22.4 atmospheres at 0° C. A 10% solution, therefore, will give

$$\frac{100}{150} \times 22.4 \times \frac{293}{273} = 14.9$$

atmospheres or $14.9 \times 760 = 11{,}314$ mm.

In this calculation we have neglected ionization. If the salt is completely ionized in this $\frac{100}{150}$ molar solution, the osmotic pressure will be twice as great. In other words the osmotic pressure of a 10% sodium iodide solution lies between 14.9 and 29.8 atmospheres (11,314 mm. — 22,628 mm.). Compare these figures with the osmotic pressure of our physiological saline solution—7.2 atmospheres. It is from 2 to 4 times as great. Can one any longer claim that the two solutions are isotonic? For according to our definition, to be considered isotonic with the blood stream, a solution must exert the same osmotic pressure as that of a 0.9% sodium chloride solution.

And now suppose that we are injecting this hypertonic sodium iodide into the blood stream. What will happen? Since we are using the syringe method, 20cc. of a 10% solution, i. e. 2 gm., will be the maximum amount injected. Compared with the volume of the blood, 4 liters, the 20cc. of water may be neglected entirely. In other words, our effects are dependent entirely upon the amount of salt injected. We calculate the osmotic pressure exerted by the 2 grams of sodium iodide as follows:

$$\frac{11.2}{150} \times 760 \times \frac{293}{273} \times 2 = 112.6 \text{ mm. (about 1/7 of an atmosphere)}$$

2 grams in 4 liters = 11.2 grams in 22.4 liters.

Therefore the injection of two grams of sodium iodide theoretically raises the osmotic pressure of the blood by 112.6 mm. or approximately 1/7 of an atmosphere, or

6,179.8 mm. (about 7.2 atmospheres) normal osmotic pressure of blood.
112.6 mm. (about .15 atmosphere) increase due to sodium iodide in blood.

6,292.4 mm. (about 7.37 atmospheres) theoretical osmotic pressure resulting from injection.

"However, the blood possesses a remarkable power of resuming its nor-

mal condition, its molecular concentration, ratio of individual constituents, ratio of corpuscles to plasma and total quantity (in about this order). This process of restitution takes place very rapidly; it is far advanced before a quick intravenous injection can be completed; the molecular concentration returns to very near normal within ten minutes; the quantity of blood and individual constituents are restored somewhat more slowly; but they are almost normal in half an hour; after two hours, the blood presents only very slight abnormalities, even when very large injections have been made." (Magnus, 1901; Sollman, 1901.)

From the foregoing it should be obvious that if solutinos must be isotonic, large volumes must be injected in many instances. In the case of sodium iodide, in order that the solution be isotonic, two grams, 31 grains, must be contained in approximately 80cc. Therefore, a therapeutic dose being the first and foremost consideration, and the employment of large volume having been definitely proven impractical and unsafe, the writer undertook investigation as to the adaptability of small volumes of more concentrated, i. e. hpyertonic, solutions. Up to the present time about thirty U.S.P. and standard remedies of established therapeutic value have been studied. This work consisted first of a pharmaceutical and chemical investigation.

Following this our solution was injected into animals to ascertain adaptability for intravenous injection and behavior in the blood stream. In addition to obtaining a general idea as to toxicity, definite lethal dose for the particular animal and standard biological tests were developed. The most important and difficult step, however, has been the clinical trial, the only accurate and safe manner of determining therapeutic dose and proper dilution. Not all remedies are adapted for intravenous injection. The behavior of remedies in contact with the blood stream has been taken up in an article entitled: "A New Field for Pharmacological and Therapeutic Research." (N.Y.M.J., 114:498, 1921.)

Specific Gravity

The following list of solutions represents six of the thirty studied. Each and every one has been recognized as containing the standard dose in the proper dilution, and is in general use by some twenty thousand physicians.

Table

Solution	Concentration at 15.5° C.	Gravity Specific
Iron and Arsenic (Iron Cacodylate)	1.3%	1.011
Sodium Iodide	10%	1.075
Sodium Salicylate	20%	1.080
Sodium Thiosulphate	10%	1.048
Salicylate and Iodide	10%	1.057
Hexamethylenamine	30%	1.067

The specific gravity figures are based on the routine determinations which are part of the definite standardization of the solution in this laboratory.

Certain manufacturers advance the argument that their products are of the same specific gravity as the blood stream. Inasmuch as they reproduce these standard formulas, doses and dilutions, the table above shows that it is absolutely ridiculous and untrue to claim that all the solutions are of the same specific gravity as the blood, and hence necessarily of the same specific gravity as each other. The specific gravity of the blood may vary from 1.04 to 1.065; the average normal specific gravity in men is accepted as 1.059; in women 1.056. To be absolutely logical, therefore, these manufacturers should offer two sets of solutions, one for male patients and one for female patients. Again it has been found that the specific gravity of the blood stream is lowered in anemia. Shall we have a special set of "anemia solutions," if anemia is found complicating the condition that the physician is treating?

The development of intravenous solutions which would prove practical and safe involved years of experimentation and study. The fundamental principles which I have discussed in this paper are only a few of the many considerations which enter into the mechanism of intravenous therapy. Many questions are still unsolved and present fascinating fields of research to the physiologist and chemist. For the present we must be guided entirely by our practical experience gained at the bedside. This may be summarized as follows:

Conclusions

1. It may be fairly stated that when large volumes of solutions must of necessity be injected intravenously, to replace blood volume, for instance, they should be isotonic with the blood.

2. Long experience on a wide scale in attempting to inject remedies for their therapeutic effect has conclusively demonstrated that large volume is in itself the cause of untoward reactions.

3. Research with certain U.S.P. and standard remedies has demonstrated that they are fully adaptable for intravenous injection in concentrated or hypertonic solutions. Such a solution contains the full therapeutic dose in a volume of from 5cc. to 20cc. In other words, a solution need not be istonic with the blood stream if a small volume only is injected.

4. Practical clinical demonstration on an extensive scale has proved conclusively that these small volume solutions, when properly prepared and controlled, have made intravenous injection a safe and practical office procedure and have enabled the practicing physician to inject intravenously some thirty odd U.S.P. and standard remedies.

New York.

THE ARMY MEDICAL CORPS*

By Merritt W. Ireland, M. D., Surgeon-General, U. S. Army,
Washington, D. C.

It gives me the utmost pleasure to greet this Association, whose membership has always manifested the highest patriotism and devotion to the welfare of the American people. It is in this interest that I come before you tonight to plead the need of your unqualified support of the Reserve Corps of the Medical Department of the Army. When I use the term Medical Department of the Army you will understand that I have in mind the great body of men of the medical and allied professions who will give willing service to the Republic in time of emergency, just as they did in the World War, for we all know now that the future great emergencies of this Nation will required this service of the entire medical profession.

No branch or department of the tremendous organization developed in the World War achieved a more splendid reputation than did the Medical Department. That achievement could not have been effected without the whole-hearted response of the profession. This day, therefore, which recalls to us so vividly that great Armistice day five years ago should also remind us of the splendid accomplishments of the American medical profession in the great war. The question I present to you tonight is, shall we forget the lessons of that experience and permit the new generation to come into the control of the destinies of the Republic without imparting to them the experience which we so dearly bought in 1917 and 1918?

You all know that the military organization of a great people cannot be effected in a day. Enrollment in the Reserve in time of peace accomplishes a very large part of the preparation for emergencies, since it immediately establishes identity of the members of the profession with the military establishment and enables the proper classification and assignment to units of individuals which will insure the application in the Army of their talents as demonstrated in civil life. Failure to establish identity with the Reserve Corps in time of peace develops a tremendous administrative burden when emergency occurs, in an effort to secure the appointment and assignment to duty of individuals. It is not the intention of the War Department to impose involuntary training or any irksome duty on members of the profession which will disturb the tranquillity of their civilian pursuits in time of peace.

The Medical Department of the Army was the first branch to conceive and secure the establishment of a reserve corps. This was as far back as 1903, although the reserve idea did not receive the sanction of Congress until 1908, when the bill reorganizing the Medical Department of the Army was passed. It was not until 1916 that the line and other staff corps of the Army adopted an officers' reserve corps. The little which we were able to

*Reprinted by permission from The Southern Medical Journal, February, 1924.

accomplish in organizing the Medical Reserve Corps prior to the World War was of tremendous value in the development of our huge war machine, but it was so small that it was quickly engulfed in the tremendous expansion of the Department. The World War taught us many lessons, but none more important than the necessity for gaining cooperation of the intelligent classes of American citizens in a peace time reserve military organization. The Act of Congress of June, 1920, gave this country its first constructive military policy and was based upon the development of an organization which should be in an emergency expanded to defend the Nation from external attack or internal disorder. The Army of the United States as now composed consists of a regular army, national guard, and organized reserve. These three components are placed on a parallel, but the organized reserves must be the important backbone of the defense of this Nation in any great emergency.

We have not up to this time achieved the success in this organization which the cause merits. In the World War we enrolled on active duty approximately 35,000 doctors. The present requirement for the organization of a force which in the opinion of the War Department would be essential for the defense of this Nation against a major attack requires approximately 45,000 doctors. Thus far we have enrolled less than 7,000. I fully appreciate the many reasons for this small number, for I realize that in the confusion and hurly-burly of the rapid war organization of an unprepared people many individuals suffered injustice in position and place.

These instances of injustice and dissatisfaction are only additional arguments for the enrollment and classification in peace time of the medical profession so that the teaching staffs of medical schools, universities and hospitals will not be disrupted, and so that individuals will be placed in positions comparable with their special training and qualifications, and so that all will be placed upon a fair and equal basis of appointment and promotion. There are well founded objections to some of the regulations now governing appointment and promotion in the Reserve Corps, but I have every reason to believe that the special regulations governing these important features will be modified at an early meeting of the board of officers controlling the policies of the Reserve Corps. The majority membership of this board is composed by law of reserve officers.

I have recently obtained from this board modifications of the rules governing appointment and promotion for the medical department sections of the Officers' Reserve Corps whereby these will be placed upon a plane far more satisfactory to the medical profession of America and to the Medical Department of the Army. Under the new system simple and comprehensible rules applying equally to all officers will govern these two fundamental elements of the Reserve.

With the lessons of the past War before us the War Department is now attempting to provide for any future emergency by organizing in time

of peace the medical personnel for our general hospitals, evacuation hospitals, surgical hospitals and hospital trains. Universities and large hospitals are asked to form these units. By doing this we expect to avoid in future the confusion which existed in the hurried organization of 1917-1918.

There is no intention, and we do not expect, that these units will be assembled except in time of emergency. The organization, therefore, is largely the enrollment of personnel carefully selected in our leisure time. The selection of all the personnel for these units, from the Commanding Officer down, is made by the university or hospital charged with the organization.

When we provide this protection we are only taking the precautions for the Nation shown by civilian communities in protecting themselves by their police powers from disorder.

The effort to form these Army units has not met with the response it should receive, and I trust the few words that have been said this evening on this subject will bring home to the medical profession its responsibility in this matter.

The Medical Department of the Army is the organization through which the medical profession of this country has always rendered its patriotic duty to the Nation. The profession has never failed to respond to the needs of the Government in time of emergency, and I am sure it will not fail to assist in making adequate preparation for the future when the goal we are striving for is understand.

I wish to express to you the hope that the members of the Southern Medical Association will join wholeheartedly with the profession in other sections of the country in making the medical reserve an institution of the civilian medical profession of America whereby organized assistance can be given to the Republic in time of need.

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EDITORIALS

THE AMERICAN RED CROSS

As a number of physicians are not aware of the activities of the Chicago Chapter of the American Red Cross, we wrote a letter to the well known Dr. H. W. Gentles, Chairman of First Aid, who has been so many years associated with the American Red Cross, and below publish his reply, which will be of great interest to all of us.

My dear Dr. Doering:

You will no doubt be interested in a letter we have received from the Director of First Aid and Life Saving at Washington. A portion of which reads:

"I have read your letter of January 15th with a great deal of interest. Please allow me to take this opportunity of congratulating the Chicago Chapter for the splendid increase in its First Aid and Life Saving work during the calendar year of 1923. I think you ought to feel proud of the progress you are making."

The Chicago Chapter feels that this was only brought about by the splendid cooperation we received from the First Aid Instructors, Life Saving Examiners and the Executives of various organizations we met during the year.

The report of figures submitted to Washington show:

1922	*First Aid.*	*1923*
1721	Number of students enrolled	2824
1151	Number certificates issued	2323
1031	Elementary certificates	1965
113	Advanced certificates (medals)	325
7	2nd Advanced certificates (bars)	33
71	Classes completed	110
	Life Saving.	
2575	Total number of tests during year	3805
	Life Savers accepted (385 sr. 688 jr.)	1075
18	Honor medals recommended	10
	Honor medal additional bars	8
	Borglum medals	2
	Competition fobs and pins	6
	Special Chapter Medals	14
	Distributed 1500 beginners and 1000 swimmers pins.	
	Canoe demonstrations	9
	Total number of Life Saving Corps	20

One-fourth of the work reported to the Red Cross is done by this Chapter, according to Headquarters report.

One of the Public Utility organizations had over 1,100 employees enrolled in First Aid classes and awarded 940 certificates which were issued from this office.

In Life Saving there has been a similar increase. The total number of examinations to date including 1922 were 4,581, while the number of tests given during 1923 were 3,805.

Again expressing our appreciation for your assistance in making this the record year in this work of the Chicago Chaper, and hoping to continue the pleasant relations, we have had in the past, believe me,

Yours sincerely,

H. W. GENTLES, M. B. C. M.,
Chairman, First Aid Committee,
Chicago Chapter, A. R. C.
58 E. Washington St.

SURGEON GENERAL HUGH S. CUMMING

This distinguished sanitarian, author, administrator, soldier and patriot has been reappointed by President Coolidge as Surgeon General, United States Public Health Service and promptly confirmed by the United States Senate. In this President Coolidge has shown his true appreciation of public service and recognition of actual worth and ability, and has won the thanks of every citizen of the United States.

Under the administrative guidance of Surgeon General Hugh S. Cumming, who assumed office in March of 1920, the Public Health Service has undergone marked changes making for greater efficiency and economy of operation. Many activities in furtherance of the public health of this country have been inaugurated and the Service today represents a more homogeneous and compact organization than at any time in the history of its career.

During the greater portion of the three years of General Cumming's administration, the Service was charged by law with the hospitalization and medical care of the ex-service man. This work had just begun when Gen. Cumming assumed office and on his shoulders fell the duty of perfecting an organization to administer this stupendous task. Under his guidance the Service hospital system was expanded from 22 hospitals in 1919 to 67 hospitals in 1922. The personnel of the Service likewise increased from 4,000 employes to 14,081 employes. When the care of the ex-service man was by Executive Order transferred to the U. S. Veterans' Bureau, under date of May 1, 1922, the Service had developed the largest and most efficient hospital system ever known to the world, with a total number of 67 running institutions and 20,718 beds. During the period from January 1,

1920, to May 1, 1922, the Service had hospitalized in its institutions 317,838 patients, with a total of 15,271,552 days hospital treatments, 2,810,585 out-patient treatments and 1,694,243 physical examinations.

The medical care and attention of the ex-service man was particularly a difficult task because of the lack of proper hospital buildings and the necessity for the utilization of what were known to be totally unsuitable and inadequate buildings.

In connection with this work a thoroughly efficient and independent General Inspection Service directly responsible to the Surgeon General was organized and the reports of this Service were found to be invaluable to the Surgeon General and to the investigating committees of Congress exposing fraudulent claims and baseless criticisms.

As a result of these extensive hospital operations, the administrative work in the Bureau was necessarily considerably expanded and it is believed that the Hospital Division in 1922 represented an ideal of organization—each section dealing with a specialized branch of the problem headed by experts of undoubted ability in their respective lines and all closely coordinated in the accomplishment of the task.

Although Congress in 1917 passed an Act appropriating money for the establishment of a Federal Home for lepers, no action was taken toward this end until the administration of Surgeon General Cumming. In the first days of his tenure of office steps were taken looking to this end with the result that the purchase of the Carville Leprosarium site was consummated with the Louisiana State authorities at a remarkably low figure. This reservation is ideally located for the care and isolation of lepers. During the last days of the 67th Congress an appropriation of $650,000 was obtained from Congress for additional facilities. When the construction work authorized by this appropriation is completed it is believed that this institution will be an ideal one of its kind. Gen. Cumming placed in charge of this Leprosarium a man whose proficiency in this line of work and reputation in the medical world for his scientific knowledge of the leprosy problem are undoubted. Experiments are being carried on under his direction of methods for the cure of leprosy and although it is too early to forecast definitely, there appears to be sound reason to believe that these experiments will result in the ultimate finding of a permanent cure for these unfortunates.

Within the last two years the Service has completed the chain of national quarantine stations by the acquisition of the New York Quarantine. Physically this is the largest quarantine station in the country and the one through which enters the largest number of ships and immigrants in the year, and its acquisition adds much to the efficient operation of the national quarantine system. Under federal regulations which it is now possible to promulgate without the embarrassment of local or state regulations commerce has been aided materially both by uniformity of operations on

this side of the Atlantic and by reason of the fact that it is now possible to coordinate with these local operations the vast work which the Service is doing abroad. The New York station was the last quarantine under state control and by its purchase by the Federal Government the United States Public Health Service now operates all of the quarantine stations in the United States—an end long sought after and intended by Congress by the passage of the basic quarantine law of 1890.

Since the end of the world war and the resumption of immigration to the United States the Public Health Service has been faced with an extremely acute problem in the matter of preventing the introduction of disease into this country. Shortly after assuming office, Gen. Cumming, who had been engaged on this work abroad before being appointed Surgeon General, detailed additional officers for duty at the various European ports and the organization of the foreign medical service was perfected and coordinated by various regulations and instructions. Consequently during this trying period of immigration, drawing as it does to the ports of the United States peoples from impoverished and devastated regions of Europe in poor physical and financial condition, no epidemic of quarantinable diseases has occurred.

During the past two years the Public Health Service has also carried on several very important new scientific investigations, namely, into the cause of botulism caused by the imperfect preparation of certain canned foods which caused a number of deaths throughout the country last year. The Public Health Service has worked in close cooperation with the National Canners Association of America, representing the canned food industry, towards a solution of this problem and much scientific data has been collected and advice given to the canners of foods which has entirely eliminated fatalities from this cause and reestablished certain of the canning industries which were threatened with bankruptcy due to the sharp falling off in sales.

The Public Health Service also detailed for special investigation of encephalitis an officer of the Public Health Service. As a result of this investigation much important data has been collected serving to inform health officers and physicians throughout the country of some of the causes, at least of the occurrence of this disease. This investigation has been both a scientific achievement and of practical value in preventing the spread of this dangerous disease.

The Service has continued the work instituted by the Public Health Service years ago along the lines of malaria, trachoma, child hygiene and other investigations. It has been the aim of Surgeon General Cumming so far as the limited personnel of the Public Health Service would permit to establish headquarters for each of these large investigational activities and place in charge thereof officers acquainted with the problem and recognized in the field of public health as experts on the subject. Malaria head-

quarters have been established at Memphis, in charge of an expert malaria man with a corps of sanitary engineers under his jurisdiction for advice to the States in carrying on demonstrations in malaria control and for the purpose of making special inspection of areas constituting malarial foci. Likewise in rural sanitation, child hygiene and trachoma have headquarters been established with competent officers in charge thereof.

Studies have been carried on of other problems nation wide in importance such as the study and prevention of goiter, the study of the effect of immigration upon insanity and scientific investigation as to the extent of and effect of the narcotic evil. Progress has been made, too, in placing the fight against venereal diseases upon a scientific and sound basis.

Soon after Gen. Cumming became Surgeon General three very serious outbreaks of bubonic plague occurred almost simultaneously in Pensacola, Florida, Beaumont, Texas, and Galveston, Texas. So alarming was the outbreak in Pensacola and the outbreak in Beaumont that the State Health Officers became alarmed and threatened to institute an old-fashioned quarantine which would have virtually tied up commerce in the South as in the yellow fever days. Gen. Cumming immediately went south and took personal charge of these epidemics and in addition to reassuring the State Health Officers, took such effective measures to stamp out the epidemic that all three ports were declared free in a short time.

With a view to perfecting the quarantine activities of the Service, Gen. Cumming established a year ago a board for the purpose of investigating fumigation methods with the possibility of devising, if possible, a new fumigant which would be equally efficient as cyanide and at the same time have combined therewith some sort of warning gas so as to reduce to the minimum the danger to the fumigating personnel of the Public Health Service and the crews of vessels being fumigated. As a result after diligent experimentation these labors were rewarded by the discovery of a gas known as cynogen which in every way meets the desired end. It is equally as efficacious from a fumigating standpoint and has combined therewith a tear gas which warns the workers of its presence before its lethal properties take effect. This type of gas has been striven for by foreign countries for years and the discovery of the combination by the Public Health Service has conferred a distinct benefit upon maritime quarantine procedure throughout the world. The British Government is particularly interested in the gas and has been prompt in ascertaining the method of its preparation and use.

Despite the enormous load thrown upon the Public Health Service about the time of Gen. Cumming's becoming Surgeon General and the necessity for sudden expansion in the Service, he thoroughly overhauled and changed the financial and bookkeeping system of the Public Health Service after conferences with General Lord, who was then Chief of the Finance Department of the Army and with other experts and the system adopted by Gen. Cumming was so efficient that it has since been adopted

by the Medical Department of the Navy after a study of all other governmental bookkeeping systems. Despite the vague charges of extravagance made from time to time against the Service when it was handling the ex-service man's problem, investigations have shown that it was then and is now conducting its hospitals more economically than any other branch of the Government service. One of the outstanding features of the Public Health Service during the past three years has been the establishment of cordial and cooperative arrangements by which it has assisted nearly every other department of the Government in their respective problems.

In addition to Gen. Cumming's work in this country his experience in public health work has been recognized abroad by his election as Director of the International Sanitary Bureau and being made an advisory member of the Health Committee of the League of Nations, his appointment on a select committee to coordinate conflicting international health interests, etc.

During the incumbency of the present Surgeon General cooperative relations have been developed between this Service and the National Park Service of the Interior Department which has supervision over all of the National Parks throughout the country. The Service has undertaken and accomplished the sanitation of these areas which yearly draw to their confines thousands of tourists from every state in the Union. Officers of the Service have made sanitary surveys of these parks and have succeeded in placing in operation sanitary methods insuring against the occurrence of epidemic diseases among this portion of the travelling public.

During the last year Surgeon General Cumming has also expanded the aid which the Service has in the past rendered other departments by establishing a branch in charge of a qualified employe to work upon the absentee problem. There is lost annually to the Government throughout the Executive Departments many thousands of dollars by reason of enforced absenteeism on account of sickness of its various employes. Also many employes have taken advantage of the courtesy of sick leave by reporting sick many times during the year when, in fact, no sickness existed—all resulting in a financial loss to the Government. By means of a close check up on the causes of absenteeism and rectifying such defect as are found at the base of such absenteeism the Service has saved to the Federal Government many thousands of dollars in the past year. This work has resulted in a notable improvement in the United States Veterans' Bureau and the Bureau of Engraving and Printing where operations on large scale were inaugurated and completed in the past year.

The Service has also increased its activity in the matter of caring for the Government employe by the establishing of a working agreement with the United States Post Office throughout the country with a view to reducing the health hazards incident to the work of that Department.

By the Act of November 23, 1921, for the promotion of maternity and infancy hygiene in the United States a board consisting of the Chief of the

Children's Bureau, the Commissioner of Education and the Surgeon General of the Public Health Service was provided for. Gen. Cumming is, therefore, a member of this board contributing to this activity his experience as a public health expert.

The above is only a very brief outline of General Cumming's numerous activities, and this country is certainly to be congratulated in having the most important matter of public health under the efficient administration, of so able an competent an authority as Surgeon General Hugh S. Cumming.

SHARP REPLY TO "LAW—NOT WAR."

[*Following is a letter addressed to the Minneapolis League of Women Voters written by Mr. Nathan H. Chase, an attorney of that city. It is stated that this communication is "the opening gun" in an effort to present the truth (that is to say, the fallacy) of the "Law—Not War" propaganda conducted in many cities. The letter is a patriotic utterance from a prominent citizen and will be read with appreciation and indorsement by thinking people*:]

I am returning the "Law—Not War" stamps that were mailed to my office and house, for the reason that I am not at all in sympathy with this propaganda that is being spread by the Women's International League for Peace and Freedom; that advocates, among other things, its members pledging themselves—in the event of this country being engaged or involved in war, irrespective of cause or circumstances—not to allow their children to anywise participate therein, not to encourage or nurse our soldiers, not to knit a sock, or roll a bandage, or drive a truck, or make a war speech, or buy a bond, or join or work for the Red Cross, or make hospital supplies, or urge food conservation.

As a result of investigation since this "Law—Not War" movement became prominent, I am satisfied in my own mind that the advocates of that species of propaganda in this country are either the willing or unconscious tools of a group of Russians, with headquarters at Moscow, who are exerting the utmost endeavor to destroy existing governments throughout the world; peaceably if possible, otherwise by the exercise of force; and I think I am warranted in stating that the United States Secret Service—and possibly the Department of State—has conclusive evidence of the extension of financial aid from Russia to this country in aid of this species of propaganda.

And, while every sane person must necessarily be in favor of going the limit, by way of arbitration, mediation, or other means, to avoid the terrible consequences of war, yet it is incomprehensible to me how any American woman, in full possession of her faculties and with the history of this

country before her, could ever subscribe to any such pledge or creed as that above set forth.

While you may not be aware of the fact, careful investigation will conclusively demonstrate that the opposition existing in certain sections of this country to appropriating money for the maintenance of armories has its origin and is fostered by "Reds," who desire and are working to eventually produce such condition as will result in their meeting with the least possible amount of resistance when the time arrives (which they thing is coming) to forcibly overthrow our existing form of government.

SEND ON DATA FOR MEDICAL BLUE BOOK

The publishers of the Illinois Medical Blue Book, McDonough & Company, 416 S. Dearborn St., Chicago, desire data pertaining to every doctor in Illinois. Blanks have been sent out to the doctors but thus far responses have been slow, the doctors seem not to realize the importance of prompt attention to this matter. We urge every physician and surgeon to send in their data at once so that the medical directory may be gotten out at once. This medical directory of the physicians in Illinois is of great value to the profession. New editions of this book have been gotten out each year for decades and we sholud all help to make the directory as accurate as possible.

Send on the data pertaining to yourself at the earliest possible moment.

Dosage and Solutions. By C. E. Garnsey, Instructor in Anatomy, Physiology, Hygiene, etc., in the Washington Sanitarium and Hospital Training School for Nurses, Washington, D. C. W. B. Saunders Company, Philadelphia.

Intended specially as a text book for training schools it treats of drugs and dosage, weights and measures, problems in solutions, hypodermic problems, various classifications of drugs, solutions, mixtures, prescription analysis, etc.

It is a small book of about 100 pages, but teaches all a nurse need or should know on this subject. It is full of practical advice, as for instance —examine the drug to be used three times—1st, when taken from shelf, 2nd, when removing from container, 3rd, when replacing on shelf. These rules are splendid.

In regard to chapter VI on hypodermic problems, we think it better to give straight out a tablet, dosage plainly marked, than to have a nurse wrestle with such problems: Give $\frac{1}{8}$ gr. morphine from $\frac{1}{6}$ gr. tablet, or give $\frac{1}{75}$ gram from $\frac{1}{60}$ gr. tablet, etc. Mistakes are too easily made. Likewise chapter on fractions. But this is otherwise a very useful little book and can be recommended.

Obstetrics for Nurses. By Joseph B. DeLee, M.D., Professor of Obstetrics, Northwestern University Medical School, Chicago. Seventh edition. W. B. Saunders Company, Philadelphia.

This splendid book is so well known and having reached its seventh edition, the reviewer's task is practically superfluous. Suffice it to say then that we consider this the best book on the subject, that we cordially recommend it to all training schools, and young physicians as well, that we are proud to have so capable an author, authority and obstetrician in our midst, and that we hope he will enjoy yet many years of activity, and succeed in building up another Lying-in Hospital on the North Side and branches elsewhere. To return to the book before us. It has been thoroughly revised and reset. Some chapters have been enlarged, and new illustrations have been added, a new chapter has been added on prenatal care, and other additions are noted throughout this splendid work.

Rubber and Gutta Percha Injections. By Charles Conrad Miller, M.D., Chicago. Price, $1.75 prepaid. Oak Printing and Publishing Co., Chicago.

A description of subcutaneous injection of rubber and gutta percha for raising the depressed nasal bridge and altering external contours, show-

ing pictures of the right material to use, the proper technique, the tolerance of tissues to foreign bodies, and a lot of other valuable information for those contemplating doing this kind of work. The author makes the suggestion that at present patients should be told that these methods are not as yet recognized as established surgical procedures.

Medical Clinics of North America (St. Louis Number). The Medical Clinics of North America (Issued Serially), one number every other month. Volume VII, Number V (March, 1924, St. Louis Number). Octavo of 311 pages and 47 illustrations. Per clinic year (July, 1923, to May, 1924). Paper $12.00; Philadelphia and London: W. B. Saunders Company.

The March number of the Medical Clinics of North America is the St. Louis number, and a most excellent one. Among the clinicians we note: Prof. McKim Marriott, Charles Hugh Neilson, Sidney Schwab, B. S. Veeder, John Zahorsky, Jno. Brady, Fr. M. Barnes, Jr., P. C. Jeans, R. A. Kinsella, Wm. H. Olmsted and a number of others. Among the interesting clinics, we may mention: pituitary tumor, focal infection; general with special reference to the prostate; intracranial hemorrhage in the newborn; nephritis in children; diphtheria; nondiabetic glycosuria and nonglycosuric diabetes, benign pyloric obstruction in the aged, etc. A very interesting number indeed.

Secrets of the Balkans. By Charles J. Vopicka, United States Envoy Extraordinary and Minister Plenipotentiary to Roumania, Serbia and Bulgaria, 1913-1920. Rand McNally & Company, Publishers, Chicago.

Charles J. Vopicka was a most worthy representative of the United States Government in the Balkans during the critical years 1913-1920. He has given us the history of these times and his active participation therein, by writing a most interesting book entitled "The Secrets of the Balkans." We earnestly advise our readers to get a copy and get a clear idea of the Balkans, their peoples, their different interests and their future relations to each other. As the author well states in his preface: "This book is intended to shed light on the causes and results of the World's most monstrous crime, and the hope that the Knowledge will help in the consummation of the Great Ideal of all civilization—a Peace on Earth which shall endure until the end of time." So pray we all.

The Biology of Internal Secretions. By Francis X. Dercum, M.D., Ph.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College. W. B. Saunders Company, Philadelphia, Pa.

Francis X. Dercum always means "the best" and hence we find in the book before us, a most interesting study of the biology of the internal secretions. The author believes that to approach this subject from the general biological point of view, the basic facts which underlie our knowledge of

the internal secretions will arrange themselves in a natural and orderly sequence. And further—that in the ultimate analysis the internal secretions are problems of metabolism. It is a most scientific study and will prove of great interest to all those fortunate to possess this book. It is interesting throughout and develops a new line of thought and investigation. Gynecologists will be much impressed by Chapter XVII in the important sex gland interrelations, and changes therein leading to neoplasms and malignancy.

The New Decalogue of Science. By Albert Edward Wiggam. Indianapolis: The Bobbs-Merrill Co., Publishers.

The author is a very able writer but unfortunately and most egotistically assumes the "I know it all" spirit and condemns and ridicules what displeases him, and lays down as irrefutable law whatever meets with his approval. The impression he leaves on the mind of the impartial reader is that of being dogmatic, presumptuously so, opinionated, destructive in his criticisms, endeavoring to substitute biology for religion.

Any fair minded man knows that religion and science are complementary to each other. The author does admit that if the religion of Jesus laid hold of men it might bring the millennium. Why, then, does he not use his talents as a lecturer and as a writer toward the furtherance of such end?

But let us comfort Mr. Wiggam. His five warnings are positively reassuring, and, in spite of his personal decalogue and ethical outlook, Christianity and Science will go along, hand in hand, exultantly and triumphantly. This is but expressing the opinion and teaching of such illustrious men as the Great Commoner and Statesman, William E. Gladstone; Lord Salisbury, Lord Balfour, Lord Acton, Lloyd George and Roosevelt; the great scientists, Lord Kelvin, Sir Oliver Lodge, Clerk Maxwell, Henry Drummond, etc.; the great poets, the Brownings, Tennyson, Chesterton, William Watson; the philosophers, Paulsen, Encke, Martineau, Bergsen, Royce, William James, G. Stanley Hall, Sabatier; the artists, George F. Watts, Burne-Jones, Tissot, Von Uhde; and a multitude of others. We have not even space to mention the clergy, such men as Cardinal Newman, Dr. F. W. Gunsaulus, Bishop Anwersen and an endless array of names. As a matter of fair play, we should like to ask: "Where would science be today but for the founding of the great universities in the middle ages by the Catholic Church?"

We agree with that Master Surgeon and most distinguished author of "Keen's Surgery," and many other books—the Nestor of the medical profession of the United States, and of world-wide fame—Professor William W. Keen, who, in his recent book "I Believe in God and in Evolution," says:

"Every year in a very long life, devoted especially to scientific teaching and writing, has only strengthened my belief in Science and the Scriptures—*the Bible, the Book of Books.*"

International Clinics (A Quarterly). Edited by Henry M. Cattell, A. M., M. D., Philadelphia; Chas. H. Mayo, M. D., Rochester, Minn. Vol. 1, Thirty-Fourth Series, 1924. Philadelphia and London. J. P. Lippincott Company.

The volume before us is Volume I of the thirty-fourth series, 1924, and among its contributors we note the names of L. F. Barker of Johns-Hopkins; N. E. Brill of Columbia University, New York; John G. Clark, University of Pennsylvania; Charles J. Drueck of the Post-Graduate Medical School, Chicago; John A. Foote of Georgetown University; A. H. Gordon of McGill University; J. P. Griffith, University of Pennsylvania; J. R. Pennington of Chicago and a number of other distinguished gentlemen.

This excellent volume contains clinical lectures on Exophthalmic Goitre by Barker; Hemorrhagic Purpura by Brill; Heart Disease in Children by Griffith, and a large number of other articles on diseases of children, diagnosis and treatment, Industrial Medicine, etc., etc., with a concluding chapter on the Progress of Medicine, 1923, by H. C. Cattell of Philadelphia and A. Parker Hutchins, Major, Medical, U. S. A. It is a very valuable edition, indeed, well illustrated and of great practical value.

Applied Pathology in Diseases of the Nose, Throat, and Ear. By Jos. C. Beck, M. D., F. A. C. S., Associate Professor of Laryngology, Rhinology, and Otology, University of Illinois College of Medicine. Illustrated. St. Louis. C. V. Mosby Company, 1923. Price $7.50.

This is an admirable book, written by a most competent author, our distinguished townsman, Professor Joseph C. Beck. It represents the author's personal experiences, and the only fault we can find with it is that it is too abbreviated. The keynote of the whole book is best expressed in the author's own words:

"It has been determined to make this work one on applied pathology, in the belief that a greater benefit will be derived from applying the pathological entities to etiology, symptoms, diagnosis, and prognosis thereby arriving at a rational basis for treatment, exclusive of the strictly surgical interventions. In other words, the fundamental object in the analysis and management of a case is a definite knowledge of the underlying pathological change present."

It is a most interesting work throughout, beautifully illustrated, and will be greatly welcomed by the profession.

The Book of Knowledge. Published by Thos. J. Caie Co., Chicago.

The Book of Knowledge is infinitely more than an encyclopedia. It is the storehouse of humanity's richest experiences. Its treasures are gathered by men who know, and revealed with accuracy, simplicity and resistless charm. All rubbish is excluded and all the finest products of human thinking and achievement are included with fine skill and artistic discrimination.

Moreover, the knowledge is well classified, thoroughly organized, and all-inclusive of the things that satisfy every inquiring mind. Yet it is presented in small, interesting units, all controlled ideally by an index with

cross references and with preferential starred topics. The editors have made an outstanding contribution to education and human betterment in their wonderful condensation and usable classification of the essentials of human knowledge and human achievement.

Government, citizenship, politics, and statescraft are set forth simply and interestingly. The formal education of the school is enriched and enlightened by the revealed secrets of all outdoors, and by the added enchantment of story, myth, legend, and classical interpretation. The home, with every detail of clothing, shelter, and family life with its happy relationships are charming set forth in picture and story. Work and recreation are admirably shown through clear, simple enticing explanations of the things a child's heart hungers to do.

In fact, this wonder book of a wonder world points every child, as well as every adult, to the big ways of entering into an appreciation of the world's largest life. Over 10,000 carefully selected pictures, many of them in color, and the added art that comes from making the world's big things simple and plain, combine to charm every inquiring mind with the magic of reality and the witchery of truth. No false appeals to the imagination, no sugar-coating of facts, no shallow tricks to secure attention, are found in these volumes, but everywhere a direct, sincere appeal through clever illustrations and facts simply, accurately, interestingly, and charmingly told.

For the sake of its rollicking children, every home should have The Book of Knowledge which answers the million questions with which children puzzle parents.

Every school should have The Book of Knowledge. The superintendent of schools will find in it an exhaustive store of helps and suggestions with which to guide his teachers in every essential field. The classroom teacher will find it indispensable. Seat work strictly educational, silent and sight reading material of the best, information for the working out of almost every conceivable problem-project, visual education De Luxe—all and much more are provided for the ready use of the busy teacher. This wonder book stands peerless in its skill to lead every hungry schoolchild into enchanting paths of discovery. This choice treasure-house permits every child to be a happy discoverer instead of a mere drudge, and it gives to every teacher the means of pointing these joyous discoverers to the leading facts in the world of reality—true land of enchantment.

Neatly, durably and attractively bound; illustrated profusely and artistically; and otherwise perfect in its mechanical makeup, The Book of Knowledge offers to every child and to every adult an open door into the mysteries, enchantment, and magic charms of a real world where big men do big things. The Book of Knowledge does answer all the questions of children and of adults, but it does more. It stimulates every soul to wider visions and to greater stretches of accomplishment. Thus, it permits every individual, in a program of joy and satisfaction, to become a true profit-sharer of the world's richest and best.

By J. W. Searson, Editor American Educational Digest, Professor of English, University of Nebraska.

Chicago Philanthropy.—Part of the $600,000 estate of Mrs. Clara A. Abbott, widow of the founder of the Abbott Laboratories, has been left to "advance the causes of medical, surgical and chemical charities," according to the terms of her will.

Bacteriology Endowed at Washington University.—The General Education Board of New York has donated $400,000 to Washington University, St. Louis, for the endowment of a department of bacteriology and preventive medicine in the medical school, it was announced March 1. This makes approximately $4,400,000 that the Rockefeller Foundation has given the university.

Drug Addiction.—Elizabeth Washburne Wright, Washington, D. C., widow of Dr. Hamilton Wright, gave an address before the Chicago Medical Society on "The International Traffic in Opium," March 5. Drs. Martin M. Ritter, Charles E. Sceleth and Joseph L. Miller took part in the discussion.

Ophthalmological Society Elects Officers.—At the annual meeting of the Chicago Ophthalmological Society, January 21, Dr. J. Brown Loring was elected president; Dr. Charles G. Darling, vice-president, and Dr. Charles P. Small, secretary-treasurer.

Zone Grows Chaulmoogra Trees.—The health department of the Canal Zone is now growing chaulmoogra trees, and it is hoped that within the next five years the local supply will be sufficient to treat all lepers on the Isthmus. Trees were planted at Corozal and Mount Hope, and the first yield is expected this year.

Society News.—Societies meeting in Chicago during the Annual Sessions of the American Medical Association, June 9-13, are: The American Radium Society, the American Society of Tropical Medicine, the Radiological Society of North America and the Associated Anesthetists of the United States and Canada.

Chicago Orthopedic Club.—The last regular meeting of the Chicago Orthopedic Club was held at the Home for Destitute Crippled Children at 8 P. M., March 14th, 1924. The meeting was in the nature of a clinical program by the orthopedic staff.

Federation Elects Officers.—At the annual business meeting of the Federation of State Medical Boards, held in Chicago, March 4, the following officers were elected: President, Dr. David A. Strickler, Denver; president-elect, Dr. Thomas McDavitt, St. Paul; vice-president, Dr. H. M. Platter, Columbus, Ohio; secretary-treasurer, Dr. Walter L. Bierring, Des Moines, Iowa; member, executive committee, Dr. Alexander McAlister, Camden, N. J.

No More Physicians Needed in South Africa.—The Witwatersrand branch of the British Medical Association, at a recent meeting in Johannesburg, took note of an item published by a leading physician in the local daily paper to the effect that South Africa could find openings for 8,000 medical men. The medical association, in resolutions, stated that this item would do a great deal of harm by encouraging medical men from overseas to immigrate to South

Africa, and it was their opinion that the country was not in a position to support more than 1,800 practitioners, which number it already has.

Dr. Herrick Honored.—A dinner was given at the Congress Hotel, Chicago, on Tuesday, February 12th, in honor of Dr. James B. Herrick, Dr. Ludwig Hektoen presiding. Addresses were made as follows:

Herrick, The Teacher.....Dr. Ernest E. Irons
Herrick, The Physician.....Dr. Hugh T. Patrick
Herrick, The Consultant.....Dr. Dean D. Lewis
Herrick, The Author.....Dr. Robert B. Preble
Herrick, The Man.....Dr. William A. Pusey

Plaut Research Fund.—Dr. Edward Plaut, president of Lehn & Fink, Inc., New York, has presented the Harriman Research Laboratory with the sum of $3,000 for the year 1924, to be known as the "Plaut Research Fund for Studies in Internal Medicine." This fund is to aid in the investigation of the effects of certain therapeutic agents, especially the endocrine glands. Dr. K. G. Falk has been placed in charge of this work by Dr. W. G. Lyle, director of the Harriman Research Laboratory.

League of Nations Appoints Americans.—Dr. Hugh S. Cumming, Surgeon-General of the U. S. Public Health Service, Washington, D. C., has been elected one of the vice-presidents of the permanent health organization of the League of Nations which recently met in Geneva, Switzerland. Dr. Otto R. Eichel, Albany, N. Y., director of vital statistics for the state department of health, has been appointed to direct the epidemiologic intelligence and statistics section of the league, and Dr. Alice Hamilton, professor of industrial medicine, Harvard Medical School, Boston, has been appointed a member of the permanent health committee.

New York City Bars Medical Film.—The exhibition of a film taken in the Wertheim Clinic, Vienna, dealing mainly with obstetrics, has been stopped by the board of health and commissioner of licenses after it had been shown to an audience of physicians and nurses at the United Engineering Societies, March 6. The Lowy Film Company has filed a complaint alleging that a number of tickets have been sold to physicians and nurses and a large expense incurred in showing the film after it had been approved by the Motion Picture Commission of New York. The complaint asks $10,000 damages. The film, it is claimed, has been shown in other cities and 95 per cent of the tickets have been sold to physicians and nurses through the mails. It is further claimed that tickets were sold at the door only to physicians and nurses.

National Tuberculosis Association.—Mrs. Theodore B. Sachs, superintendent of the Chicago Tuberculosis Institute, will be glad to have the Institute take charge of hotels and railroad reservations for doctors, nurses and others who wish to attend the annual meeting of the National Tuberculosis Association to be held in Atlanta, Ga., May 5th to 10th.

If bought on the certificate plan, railroad tickets will be good from May 1st to 14th, inclusive, at a charge of 1½ times the one way fare; this will amount to $40.08 from Chicago. The price of the berths will be: Lower, $8.25; upper, $6.60; drawing room, $30.00; compartment, $23.25. Either the Pennsylvania or the Big Four route may be used.

American Congress on Internal Medicine.—At the eighth annual meeting of the congress in St. Louis, February 18-23, the following officers were elected for the ensuing year: President, Dr. William Gerry Morgan, Washing-

ton, D. C.; vice-presidents, Drs. Leonard M. Murray, Toronto, Canada, and Roy R. Snowden, Pittsburgh; treasurer, Dr. Clement R. Jones, Pittsburgh, and secretary general, Dr. Frank Smithies, Chicago (reelected). Washington, D. C., was chosen as the meeting place of the congress in 1925. The American College of Physicians conferred fellowships on 178 candidates. The officers for the years are: President, Dr. Harlow Brooks, New York; vice-presidents, Dr. Jabez Elliott, Toronto, Canada, and Dr. Aldred Scott Warthin, Ann Arbor, Mich.; treasurer, Dr. Clement R. Jones, Pittsburgh, and secretary general, Dr. Frank Smithies, Chicago. Dr. Aldred S. Warthin, Ann Arbor, was selected as editor-in-chief of the *Annals of Clinical Medicine*, the official publication of the American College of Physicians and the American Congress of Internal Medicine. His duties began July 1.

Report of Carnegie Foundation.—The Carnegie Foundation for the Advancement of Teaching has issued its eighteenth annual report for the year ending June 30, 1923. Of the 661 former college teachers and their widows receiving allowances from the foundation, 103 are from New York, 88 from Massachusetts and 58 from Connecticut. Former teachers at Harvard University, Boston, have received $874,000; at Yale, $753,000; at Columbia, $666,000, and at Cornell, $519,000. A list of obituaries of distinguished scholars is given. Copies of the report may be had on application, without charge. The total resources of the foundation amount to $27,329,000, of which $15,192,000 belongs to the permanent general endowment, $9,658,000 to a reserve fund for the retirement during the next sixty years of teachers now in associated institutions, $1,292,000 to the endowment of the division of educational inquiry, and $758,000 to a reserve fund to be expended in aiding universities and colleges to adopt the new plan of contractual annuities.

Smallpox in Michigan.—According to the state health department, smallpox is spreading in Michigan. Violent outbreaks prevail in parts of Canada, where there were 5 fatal cases within forty-eight hours in one community. Dr. Olin, Michigan state health commissioner, fears that this type of disease may become epidemic in Michigan. During January, 50 cases were reported in Ottawa County, 37 in Eaton, 36 in Jackson, 29 in Ingham, 23 in Lenawee, 20 in Oakland, 19 in Calhoun, 15 in Sanilac and Hillsdale counties, and 52 in Wayne County. There were 505 cases reported during the first 28 days in February. —Reports received by the U. S. Public Health Service from Health Commissioner Henry F. Vaughan of Detroit show an unusual smallpox morbidity in that city. One hundred and thirty-nine cases were reported in January, and 82 in the week ending February 23. According to information received in Washington from Assistant Surgeon Boggess of the U. S. Public Health Service, the disease first appeared at Windsor, Canada. Five deaths from smallpox have been reported at Windsor and two at Detroit. The Public Health Service has authorized the appointment of ten acting assistant surgeons to help meet the situation, and they will be at once assigned to Detroit.

Venereal Disease Information is a monthly publication issued by the U. S. Public Health Service for use in its cooperative work with state health departments in the control of venereal diseases. It contains specially prepared articles on various aspects of venereal diseases, including diagnosis, treatment, etc., as well as a digest of venereal disease articles appearing in 120 foreign language journals, 39 British and colonial journals, 2 international journals, and 87 American journals.

The purpose of this publication is to make available to general practitioners, laboratory and other research workers, current venereal disease findings

and opinions. The abstracts are brief but to the point, so that physicians can obtain a clear idea of the progress being made everywhere in the subject of venereal diseases.

This monthly publication can be obtained at the subscription price of 50 cents per annum, or 5 cents per single copy, sent direct to the Superintendent of Documents, Government Printing Office, Washington, D. C., in cash, check or money order (not stamps).

It is realized that the prompt detection and prompt adequate treatment of venereal diseases by physicians are essential in the control of these diseases, and the purpose of *Venereal Disease Information* is to aid physicians in this work by collecting from all sources and bringing regularly to their attention, advances in the diagnosis, treatment and care of persons afflicted with these diseases.

The entire field of venereal diseases is covered in this publication in a brief and easily readable form.

Books on Tuberculosis.—Mrs. Theodore B. Sachs, Superintendent of the Chicago Tuberculosis Institute, announces the recataloguing of the library of the Institute. This library consists of several hundred volumes on health subjects, particularly tuberculosis and child health.

The work is being done by Miss McLaughlin of the Branches Dept. of the Chicago Public Library. The books will be classified by means of a card system as to authors, titles and subject matter, so that the material will be readily available for any one interested.

This library, altho not large, is a valuable one and is at the service of doctors, nurses and laymen as well as the Institute's own workers.

A New X-Ray Tube.—A new water-cooled, high voltage, X-Ray tube, developed by Dr. W. D. Coolidge of the General Electric research laboratory, has received a hearty medical endorsement, following a thorough trial in cancer treatment by Dr. James T. Case, a prominent X-Ray specialist of Battle Creek, Michigan. Doctor Case installed one of these tubes in the radiotherapy department of the Battle Creek Sanitarium in the summer of 1923, where a large series of animal experiments was undertaken. Since the first of August, 1923, all the clinical material requiring roentgenotherapy at that institution was handled with the new tube.

Radiation from X-Ray tubes has been, for many years, used in cancer treatment. For some time these tubes were of comparatively low output and their successful use was confined to the treatment of tumors not too deeply seated. The development of the original Coolidge tube gave the X-Ray specialist a much more powerful tube and, in 1921, Dr. Coolidge brought out a new design capable of operating at higher voltage (200,000 volts maximum), which, because it gave radiations of shorter wave length and consequently greater penetration, was more adapted for treating deep-seated cancer.

But even with this tube, with a power output of more than a kilowatt, the treatment for cancer was long and tedious, the patient being forced to remain still for sometimes three hours or more—often in uncomfortable positions—and it therefore seemed desirable to develop a tube with a still higher power output, in order to shorten the time for treatment. To bring this about, Dr. Coolidge devoted himself to the development of an X-Ray tube for this purpose, of a greater power than any hitherto known. By increasing the voltage and the current through the tube, he knew that the intensity of the rays would

Following the Acute Infections

prompt and uncomplicated recovery almost always calls for the systematic use of an efficient restorative tonic—a preparation that will place the least possible burden on the digestive and assimilative functions of the body, but will at the same time supply the support so urgently needed by weakened and exhausted tissues.

The constantly increasing number of medical men that have come to rely on

Gray's Glycerine Tonic Comp.

as a reconstructive tonic, tell beyond all question of its efficiency for the foregoing purposes. Under its use, functional activity is promptly increased, the nutrition is rapidly improved, and the defensive forces of the body are substantially raised.
Gray's Glycerine Tonic Comp. is thus recognized by the busy practitioner as a body-builder to which he can "pin his faith" as a dependable means of promoting convalescence and hastening recovery. A trial of this reliable tonic will show its exceptional value following the acute infections prevalent at this season of the year

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SUPRARENALIN SOLUTION **1:1000** is the incomparable preparation of the kind. It keeps well and is put up in a g. s. bottle with cup stopper. By working from the solution in the cup, contamination of the contents of the original package is avoided.

Ischemic action of Suprarenalin Solution is enhanced and prolonged by the addition of equal parts of Pituitary Liquid (Armour), the Premier Product of Posterior Pituitary.

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be correspondingly increased. The problem was to design and produce a tube capable of carrying continuously a greatly increased load.

Accordingly, after some time devoted to experiments and research work, he first produced a tube with an anode or target made of a large flat plate of tungsten with sufficient surface to radiate continuously the energy absorbed when the tube was operated at 30 milliamperes and 200,000 volts. The tube was operated in an oil bath, which was water-cooled. It was described in a paper read before the Radiological Society of North America in December, 1922. But, although this new tube gave about four times the output of prior tubes, Dr. Coolidge was not satisfied. He continued his work until he had developed a still more powerful tube (250,000 volts, 50 milliamperes), again multiplying the output by four or, in other words, having an X-Ray output about fifteen times that of the tubes then in use for cancer treatment.

The new tube is equipped with a water-cooled anode, a seamless metal tube utilized to conduct the water in and out of the X-Ray tube, the solder between tubing and target being depended upon only for making thermal contact and not for making a vacuum-tight joint. The glass bulb is eight inches in diameter. The tube is operated in conjunction with a generating outfit consisting essentially of a high-tension transformer, rectifying switch and resistance control. An insulated water system is used in cooling the tube.

The new tube was exhibited at the annual convention of the American Medical Association, in June, 1923, at San Francisco. But before offering the tube for sale and general use, Dr. Coolidge wished authoritative medical advice on the therapeutic effects of this new high-power tool. Would the effect on the patient of such high-power, short-time treatment be better or worse than, or just the same as that of the longer, lower intensity treatment with the older tubes?

In order to obtain the answer to this question, it was decided to submit the tube to a prominent X-Ray specialist for trial. Accordingly, a tube was placed in the hands of Doctor Case in Battle Creek, whose report on the results obtained from its use was recently submitted.

Dr. Case, in his preliminary report, says: "Up to the present the X-Ray deep therapy in use affords not over 6 milliamperes for continuous use from one tube at 200,000 to 220,000 volts delivered at the tube, requiring therefore, for the application of 600 milliampere-minutes, the very tedious and (for the patient) very uncomfortable expenditure of 100 minutes. There are at least 350 deep therapy installations in the United States and Canada today, and many of these are by their makers restricted to the use of 4 milliamperes of current through the tube.

"Recently Dr. W. D. Coolidge, of Schenectady, N. Y., has perfected the invention of a new therapy X-Ray tube, especially cooled by a circulating water system, applicable to either superficial or deep roentgenotherapeutic work, which is standardized as being able to withstand the **continuous output of up to 50 milliamperes at 250,000 volts,** an intensity of radiation hitherto scarcely dreamed of.

"Through the courtesy of Dr. Coolidge last summer there was installed in the radiotherapy department of the Battle Creek Sanitarium the first one of these new tubes . . . . and, since the first of August, 1923, all our clinical material requiring roentgenotherapy has been handled with the new tube at high milliampere and voltage readings. Applications formerly requiring from three to four hours may now be concluded within fifteen to eighteen minutes,

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The place of CÉLESTINS Vihcy in the dietary is distinctive and important. It is an alkaline water of diuretic action, and is indicated in cases of the following:

Chronic hepatic disorders; gastric and intestinal indigestions; acid dyspepsia; chronic catarrhal gastritis or enteritis; rheumatism; diabetes; inflammation of the bladder; and a large number of minor ailments.

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A booklet on the therapeutic uses of CELESTINS Vichy will be sent on request.

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to check a persistent, "hang-on" Winter cough—should be remembered.

It acts as a bronchial sedative and expectorant.

SAMPLES ON REQUEST

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and the average dose actually desirable in any one day needs only five to ten minutes. . . .

"Fortunately, the new tube also permits the use of as low a current intensity as one milliampere at the same high voltage. We were thus permitted to carry out a series of comparative observations to determine if possible an answer to the problem: Given a fixed dose of say 450 milliampere-minutes, is there any difference in the clinical effect if the application is made at the rate of 2.5 milliamperes per minute or at the rate of 25 milliamperes per minute?

"We could have made the difference in the time ratio as high as 60 to 1, but we actually did our experiments with a difference in the time ratio of 10 to 1 for the most part, though latterly with a time ratio difference of 25 to 1. We reasoned that if a difference really existed, it would be at least indicated with the ratio of application of 10 to 1, especially as the work was made to conform to a rather extensive series of experiments and observations simultaneously carried on relative to the toxicity resulting from irradiation.

"In accordance with our experimental studies as well as our observations on all our patients subjected to roentgenotherapy since August 1, 1923, we may say without hesitation that the experiments and experiences show clearly that within the limits of our observation, that is, with a difference in the time ratio as great as 10 to 1, the physiological and clinical effects are directly related to the amount of energy applied, regardless of the time factor.

" . . . . It is evident to us that we may freely and fearlessly take advantage of the tremendous increase in efficiency of the new water-cooled Coolidge tube, shortening very greatly the time of application of any desired dose, with gratification to both patient and physician, and without prejudicing the results to be expected in the light of the mass of data already published based on the much slower rate per minute of application. We have been especially happy to note a very marked diminution in the frequency and severity of post-irradiation sickness, which is now seldom observed in our practice, although we have not cut down the total amount of irradiation administered at one sitting."

The accessory apparatus, including the water cooling system, required by the new tube, has been developed by the Victor X-Ray Corporation, of Chicago, who are now selling both tube and apparatus.

CONSTIPATION is practically at the bottom of the great majority of ills to which the flesh is heir. Physicians realize that unless elimination is perfect the waste products remain in the body and auto-intoxication and its long list of accompanying disorders result.

PLUTO WATER IS

an eliminant, a solvent and a mild purgative, with the ability to cleanse the intestinal tract and thus aid in the restoration of metabolic equilibrium.

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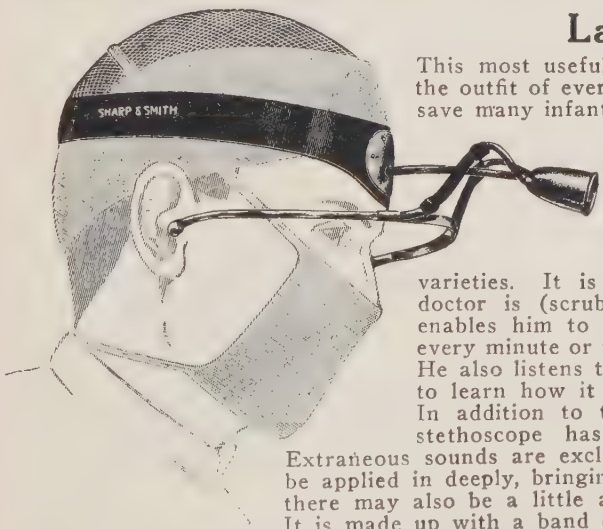

This most useful instrument should be part of the outfit of every obstetric practitioner. It will save many infants' and mothers' lives.

It was designed especially for use during the second stage of labor of both (spontaneous and operative), but it is even more useful for all the purposes of a stethoscope than the usual varieties. It is worn on the head after the doctor is (scrubbed up) for the delivery and enables him to listen to the fetal heart tones every minute or two without infecting his hands. He also listens to the mother's heart frequently to learn how it is bearing the strain of labor. In addition to this great advantage the head stethoscope has valuable acoustic properties. Extraneous sounds are excluded; by pressure the bell can be applied in deeply, bringing it closer to the fetal heart—there may also be a little audition from bone conduction. It is made up with a band over the top of the head, with a circular fibre head band and, for easy portability, with a ribbon woven strap.

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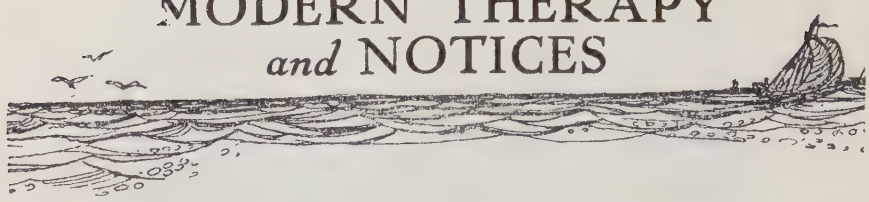

A NEW SILVER COMPOUND

Of silver compounds there is no end. Always, it seems, the advantage is offset, in part at least, by some disadvantage; and to the credit of the manufacturing chemist be it said that the disadvantages as they appear stimulate further research, to the end that a perfect product may be evolved. One of the latest and in one sense the most acceptable of these compounds is Neo-Silvol.

Neo-Silvol is silver iodide in colloidal form. The "Neo" applies to the color, for Neo-Silvol makes a milky, opalescent solution, in contradistinction to the brownness of the ordinary silver antiseptics.

We are told by the manufacturers, Parke, Davis & Co., that Neo-Silvol has a phenol coefficient of 1—in other words that it is equal, in certain circumstances, to carbolic acid as a germicide; and that solutions as concentrated as 50% have very little if any irritating effect when applied to infected and inflamed mucous membrane.

IMPORTANT DECISION HELPS AMERICAN CHEMISTRY

The decision of the United States Court, District of Delaware, in favor of The Chemical Foundation, Inc., is of far-reaching importance to the medical profession, and to the manufacturers of medicinal chemicals.

It will be remembered that prior to the World War, the medical profession was practically dependent upon foreign sources of supply for many important drugs. Patents were held in this country by foreign owners—not that the drugs might be manufactured here, but that American firms might not make them.

In order to establish and foster the chemical industry in this country, the patents were sold by the United States Government to The Chemical Foundation, Inc., so that no exclusive licenses might be issued to American concerns. This plan of devoting these patents to the public use has stood the test of actual trial, and has proven a success. Many of the important medicinal chemicals previously unobtainable from American sources, are now manufactured in this country, and the medical profession now has the assurance that, unless there should be some later and unexpected reversal of this decision, they may never again be dependent upon foreign monopoly in drug supplies.

As stated in *Drug & Chemical Market*, "The complete exoneration of the officials and trustees of The Chemical Foundation and the justification of all their plans to preserve an independent chemical industry as a Na-

Whole Grains

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Quaker Puffed Grains are made by causing 125 million steam explosions in every kernel.

This breaks the food cells for easy digestion. The whole grain elements are supremely fitted to feed.

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Each flavory grain is an airy tid-bit puffed to 8 times its size. The terrific heat gives a rich nut-like taste that everybody likes.

Children revel in Puffed Grains. Serve it morning, noon and night.

Puffed Rice is the confection of breakfast foods. Puffed Wheat in milk or half and half is an ideal way to serve whole wheat—an inviting dish at night.

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Quaker Puffed Rice

The Endermic Route

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This emplastrum—containing guaiacol, formalin, creosote, quinine, and methyl salicylate in a kaolin base—enables you to get a fever temperature under immediate control.

It is indicated in every febrile condition, congestion, inflammation, swelling, pain or fever.

We will send, free of charge, a generous size jar for clinical test. Write for it to-day.

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tional weapon of defense, is gratifying not alone to them individually, but to all right-thinking and patriotic citizens."

The Oil, Paint and Drug Reporter says editorially, "The effect of the decision should be one of the greatest encouragement. In fact, it should be beneficial to the whole field of chemistry and related science in this country, as it makes clear that chemistry and its allies function importantly in the interest of the public and the nation."

To further foster the use of American-made medicinals, the Federal Trade Commission, the National Research Council, the Council on Pharmacy and Chemistry of the American Medical Association, and other agencies have suggested and provided new and distinctive names for American synthetics which are rapidly replacing those formerly made only abroad.

It has been frequently suggested that physicians might be performing a patriotic duty to use, specify, and refer to these drugs by their American names.

Among the products so designated are Arsphenamine, Neoarsphenamine, Barbital, Barbital Sodium, Cinchophen, Neocinchophen and Procaine.

The Chemical Foundation, Inc., also licensed certain manufacturers to make, in this country, Acriflavine and Neutral Acriflavine.

Inasmuch as "This sale was in effect a sale to America and its citizens, not to persons then engaged in chemical and allied industries," the medical profession is to be congratulated, and it is hoped will take advantage of this opportunity to encourage an independent chemical industry in this country.

FUNCTIONAL HEART DISEASES

"I have prescribed your Cactina Pillets," says a well-known practitioner, "in numerous cases of functional heart troubles during the last seven years with excellent results. In my hands it has proved the remedy par excellence in the so-called 'soldier's' or 'nicotine heart.' Indeed, I have found that both functional and organic cardiac disorders are often benefited by Cactina Pillets when other measures fail completely. It is always gratifying to me, moreover, to observe the promptness with which one of three Cactina Pillets will tranquillize the excitable heart following physical strains or excesses."

CHRONIC BOWEL STASIS

In the treatment of chronic bowel stasis, it has been definitely shown that we can expect satisfactory results only in so far as we are able to regulate and assist the physiologic processes of the bowels. Prunoids owe their notable efficiency to their capacity for accomplishing the foregoing and promoting the natural functions of the intestinal canal. Thorough evacuation follows as a physiologic sequence, without griping, distress, or the reactionary constipation which is so common after the use of ordinary laxatives and cathartics.

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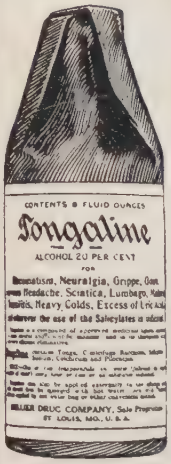

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SAMPLES ON APPLICATION

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LAXATIVE

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The busy practical physician is apt to appreciate any preparation which he can rely upon to yield dependable action in any certain class of indications. He finds it a saving of time and trouble to have such agents always at hand, making it unnecessary to write a prescription or wait for same to be compounded. He is apt to believe also that certain combinations of therapeutic agents, which have been made the object of use for many years in a wide range of cases, are to be preferred to extemporized mixtures.

Years ago, a practical doctor found it necessary to evolve for his own use such a combination of astringent, antiseptic, styptic, detergent, soothing and healing agents as would best serve him in the treatment of leucorrhoea, vaginitis, ulceration and erosion of the cervix, endocervicitis, pruritus, etc.

Having a practical knowledge of drugs and of drug action, he worked out a combination which proved so satisfactory in his own hands and in those of certain colleagues to whom he recommended it, that its reputation gained sufficient importance to suggest its manufacture on a scale large enough to permit of its introduction to the profession, generally. Micajah's Medicated Wafers were accordingly brought to the attention of physicians and have steadily increased in use. They are convenient to use, economical, dependable in action and effect. The wafers can be used as such or powdered for use on tampon or in the insufflator or they can be dissolved in water and used as an injection or application.

Micajah's Medicated Wafers are advertised to the medical profession only, along strictly ethical lines. Any physician who has not yet become acquainted with their practical advantages can easily convince himself as to their value by sending for a sample and literature to MICAJAH & CO., 143 Conewango Avenue, Warren, Pa.

STIMULATING THE LIVER

An active cholagogue is urgently needed in certain diseases, but too often the beneficial effects obtained are endangered by the excessive catharsis that is incidentally produced. In Chionia the practitioner has a reliable hepatic stimulant that he can rely upon to promote functional activity of the liver without causing greater stimulation of the bowels than is desirable.

One to two teaspoonfuls in water, three times a day, is the dosage usually employed. In cases of extreme hepatic torpor, many physicians find it helpful to have the patient take, in addition to Chionia, a moderate dose of sodium phosphate every morning one-half hour before breakfast, for a week or ten days.

FOR LAZY, INACTIVE STOMACHS

"Seng is a jewel when indicated," says Dr. J. W. McN———. "I do not maintain that it will cure all cases of dyspepsia, but I know it will tone up a weakened stomach. I use very little pepsin and have little faith in it, since I feel that you cannot cure a weak stomach by doing its work. Seng urges and encourages the lazy glands to restart the process of digestion."

ELECTROLYSIS
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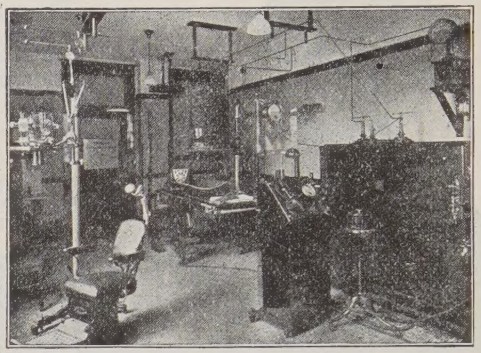

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